

Appendix F

Preliminary CHART Assessment for the Central Valley Spring-run Chinook ESU

ESU Description

The CV spring-run chinook ESU was listed as a threatened species in 1999 (64 FR 50394). The ESU includes all naturally spawned populations of spring-run chinook salmon in the Sacramento River and its tributaries. The agency recently conducted a review to update the ESU's status, taking into account new information and considering the net contribution of artificial propagation efforts in the ESU. A single artificially propagated spring-run chinook stock resides within the historical geographic range of the ESU (Feather River Hatchery spring run chinook program), but it is not considered part of the ESU because of introgression with fall run chinook salmon. NMFS has proposed that the CV spring run chinook ESU remain listed as a threatened species (69 FR 33102; June 14, 2004). No artificial propagation programs were proposed for listing.

A Technical Recovery Team has been established for the Central Valley recovery planning domain and it has identified historic and extant demographically independent populations of spring chinook (NMFS 2004; NOAA Technical Memorandum NOAA-TM-NMFS-SWFSC-370). The TRT divided the spring-run chinook ESU into four geographic groups. Members of each group inhabit similar environments based on a principle components analysis of environmental variables. The four geographic groups are the southern Cascades, northern Sierra, southern Sierra, and Coast Range. The TRT identified at least 18 historically demographically independent populations of spring run chinook distributed among these four geographic areas, plus an additional seven likely dependent populations that may have been strongly influenced by adjacent independent population. Three of the 18 independent populations are extant (Mill, Deer and Butte Creek populations) and all occur in the Southern Cascade geographic area. Several extant dependent populations have intermittent runs of spring chinook including Big Chico, Antelope, and Beegum Creeks. Recovery planning will likely emphasize the need for having viable populations distributed across the range of the identified geographic areas (Ruckelshaus et al. 2002, McElhany et al. 2003). Recovery planning efforts are currently focused on working with the CalFed and Central Valley Project Improvement Act programs to implement habitat restoration projects and other recovery related efforts in the Central Valley. The biological team considered the TRT products in rating each

watershed and also solicited input from the TRT on-the distributional and habitat use information that was compiled as well as the conservation assessment of occupied HSAs. As recovery planning proceeds, we anticipate having additional and better information which may lead to revisions in our recommended critical habitat designations.

CHART Area Assessments

The CHART assessment for the CV spring run chinook ESU addressed 37 occupied CALWATER Hydrologic Subareas organized or nested in 15 associated CALWATER 6 Hydrologic Units (HUs) or subbasins (Figures A1 and A2). This assessment also included four HSAs that encompass the San Francisco-San Pablo-Suisun Bay complex which constitutes rearing and migration habitat for this ESU. This complex is treated as a separate unit in the following ESU description even though it is not a CALWATER HU. The HSAs were chosen as freshwater critical habitat units because they provide a convenient and systematic way to organize the CHART's watershed assessments for this ESU. Information presented below for individual Hus (size, counties, total stream miles, occupied stream miles, and habitat use) were generated using GIS from data sets compiled by NMFS Southwest Region (NMFS 2004a).

Unit 1. Tehama Subbasin (HU#5504)

The Tehama HU is located in the northern central portion of the ESU and includes portions of the mainstem Sacramento River, the lower portions of two westside tributaries (Thomes and Stony Creeks) and the lower portions of three eastside tributaries (Mill Creek, Deer Creek, and Pine Creek). The HU encompasses an area approximately 1,119 square miles and occurs primarily in Tehama County, but also in portions of Butte and Glenn Counties. The HU contains 2 HSAs, both of which are occupied, and 1,879 stream miles (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 250 miles of occupied riverine and/or estuarine habitat in the 2 occupied HSAs (NMFS 2004a). The CHART concluded that these occupied HSAs contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) and identified several management activities that may affect the PCEs. Table F1 summarizes the total miles of occupied riverine/estuarine reaches for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F1 depicts the specific areas in this HU that are occupied by the ESU and under consideration for the critical habitat designation. The team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 2. Whitmore Subbasin (HU#5507)

The Whitmore HU is located in the north eastern portion of the ESU and includes portions of upper Battle Creek (North and South Forks), upper Bear Creek, and the Cow Creek watershed. The HU encompasses an area approximately 913 mi² and occurs in Shasta and Tehama Counties. This HU contains 7 HSAs, 4 of which are occupied, and approximately 990 stream miles (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 58 miles of occupied riverine/estuarine habitat in the 4 occupied HSAs (NMFS 2004a). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) and identified management activities that may affect the PCEs. Table F1 summarizes the total miles of occupied riverine and estuarine reaches identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F2 depicts the specific areas in this HU that are occupied by the ESU and under consideration for the critical habitat designation. The team did not identify any unoccupied habitat areas in this subbasin that may be essential to the conservation of the ESU.

Unit 3. Redding Subbasin (HU# 5508)

The Redding HU is located in the northern most portion of the ESU and includes portions of the upper Sacramento River mainstem, westside tributaries including Cottonwood Creek (portions of both the Middle and South Forks) and Clear Creek, and the lower portions of several eastside tributaries (Cow Creek, Bear Creek, and lower Battle Creek). The HU encompasses an area of approximately 705 mi² and occurs in Shasta and Tehama Counties. This HU contains 2 HSAs, both of which are occupied, and a total of 1,030 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 159 miles of occupied riverine habitat in the 2 occupied HSAs (NMFS 2004a). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) and identified management activities that may affect the PCEs. Table F1 summarizes the total miles of occupied riverine and estuarine reaches identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F3 depicts the specific areas in this HU that are occupied by the ESU and under consideration for the critical habitat designation. The team did not identify any unoccupied areas in this subbasin that may be essential to the conservation of the ESU.

Unit 4. Eastern Tehama Subbasin (HU# 5509)

The Eastern Tehama HU is located in the northeastern portion of the ESU and includes portions of several significant watersheds including Mill Creek, Deer Creek, Antelope Creek, and the upper portion of Big Chico Creek. The HU encompasses an area of approximately 896 mi² and occurs primarily in Tehama County with small portions in Butte, Shasta, and Plumas Counties. This HU contains 10 HSAs, only 4 of which are occupied, and a total of 1,049 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 117 miles of occupied riverine habitat in the 4 occupied HSA (NMFS 2004a). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F1 summarizes the total miles of occupied riverine and estuarine habitat for the HSA that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F4 depicts the specific areas in this HU that are occupied by the ESU and under consideration for the critical habitat designation. The team did not identify any unoccupied areas in this subbasin that may be essential to the conservation of the ESU.

Unit 5. Sacramento Delta Subbasin (HU# 5510)

The Sacramento Delta HU is located in the southern portion of the ESU and includes portions of the Sacramento River and Deep Water Ship Channel. The HU encompasses an area of approximately 446 mi² and occurs in portions of Yolo, Sacramento, and Solano Counties. This HU contains a single HSA which is occupied, and approximately 355 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 180 miles of occupied riverine habitat in this HSA (NMFS 2004a). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F1 summarizes the total miles of occupied riverine and estuarine reaches identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F5 depicts the specific areas in this HU that are occupied by the ESU and under consideration for the critical habitat designation. The team did not identify any unoccupied areas in this subbasin that may be essential to the conservation of the ESU.

Unit 6. Valley Putah-Cache Subbasin (HU# 5511)

The Valley Putah-Cache HU is located in the southern portion of the ESU and includes a portion of the Yolo Bypass. This HU encompasses an area of approximately 961 mi² and occurs primarily in Yolo and Solano Counties. This HU contains 2 HSAs, one of which is occupied, and 751 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 16 miles of occupied riverine habitat in this HSA (NMFS 2004a). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F1 summarizes the total miles of occupied riverine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F6 depicts the specific areas in this HU that are occupied by the ESU and under consideration for the critical habitat designation. The team did not identify any unoccupied areas in this subbasin that may be essential to the conservation of the ESU.

Unit 7. Marysville Subbasin (HU# 5515)

The Marysville HU is located in the central portion of the ESU and includes portions of the Feather River and Yuba River. This HU encompasses an area of approximately 417 mi² and occurs primarily in Butte and Yuba Counties with smaller portions located in Sutter and Placer Counties. The HU contains 3 HSAs, 2 of which are occupied, and 562 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 58 miles of occupied riverine habitat in the 2 HSAs (NMFS 2004a). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F1 summarizes the total miles of occupied riverine and estuarine reaches identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F7 depicts the specific areas in this HU that are occupied by the ESU and under consideration for the critical habitat designation.

The CHART team did not identify any unoccupied habitat areas in this subbasin that may be essential for the conservation of the ESU; however, the team did conclude that inaccessible stream reaches in the Upper Feather River above Oroville Dam in the adjacent subbasin (HU#5518) may be essential to the conservation of this ESU (NMFS 2004g). Specifically, the team identified the following stream reaches above Oroville

Dam that may be essential for conservation of this ESU: from Oroville Dam upstream along the West Branch of the Feather River to the vicinity of Kimsheew Falls; along the North Fork of the Feather River upstream of the location of Lake Almanor; along the East Branch of the NF Feather River including Indian Creek and Spanish Creek; the South Middle Fork of the Feather River, and the South Fork of the Feather River upstream to the first natural impassible barrier. Both spring-run chinook and steelhead historically occurred in the Upper Feather River prior to Pacific Gas and Electric's hydroelectric development in the North Fork watershed and the construction of Oroville Dam. Construction of Oroville Dam extirpated both the spring-run chinook and steelhead populations in this upper watershed. The team concluded that spawning, rearing, and migratory habitat occurs above Oroville Dam in these inaccessible reaches, but it is in better condition for steelhead than spring-run chinook salmon. The feasibility of providing fish passage past Oroville Dam is currently being evaluated through the ongoing FERC relicensing process for this facility. The team concluded this inaccessible habitat may be essential for the conservation of this ESU because the genetic integrity of spring-run chinook in the Lower Feather River has been compromised by Feather River Hatchery practices (i.e. introgression of spring and fall runs in the hatchery), and providing access to the unoccupied habitat above the dam would allow for expansion of the population in this watershed.

Unit 8. Yuba River Subbasin (HU# 5517)

The Yuba River Santa Clara HU is located in the central and eastern portion of the ESU and includes part of the upper Yuba River watershed. This HU encompasses an area of approximately 1,436 mi² and occurs in several Counties including: Butte, Nevada, Placer, Plumas, Sierra, and Yuba. The HU contains 16 HSAs, 4 of which are occupied, and 2,048 miles of streams (at 1:100,000 hydrography); however, most of the HSAs are outside the recognized boundary of the ESU. Fish distribution and habitat use data compiled by NMFS biologists identify only approximately 22 miles of occupied riverine habitat in the occupied HSAs (NMFS 2004a). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F1 summarizes the total miles of occupied riverine and estuarine reaches identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F8 depicts the specific areas in this HU that are occupied by the ESU and under consideration for the critical habitat designation.

The CHART team concluded that inaccessible stream reaches on the Upper Yuba River above Englebright Dam may be essential to the conservation of this ESU, including those upstream reaches on the North Yuba to New Bullards Bar Dam, on the Middle Yuba to Milton Dam, and on the South Yuba to Lake Spaulding (NMFS 2004g). All three forks of the Upper Yuba River historically supported populations of spring chinook and steelhead (Yoshiyama et al., 1995). The team considered this area to be essential for conservation because it provides one of the largest areas of suitable habitat in the Central Valley that can be accessed by providing passage at one relatively small dam. The Lower Yuba is also considered to have a good “seed” population of both spring chinook and steelhead and both populations are considered relatively free of hatchery influence. A large, multi-million dollar study program is underway through the CALFED Ecological Restoration Program to evaluate the feasibility of restoring anadromous salmonid populations to the Upper Yuba River.

Unit 9. Valley-American Subbasin (HU# 5519)

The Valley-American HU is located in the south-central and eastern portion of the ESU and includes portions of the Lower American, the mainstem Sacramento River, and the lower Feather River. This HU encompasses an area of approximately 958 mi² and occurs primarily in Placer, Sacramento, Sutter, and Yuba Counties. The HU contains 4 HSAs, only 2 of which are occupied, and approximately 1,188 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify only approximately 61 miles of occupied riverine habitat in the 2 HSAs (NMFS 2004a). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F1 summarizes the total miles of occupied riverine and estuarine reaches identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F9 depicts the specific areas in this HU that are occupied by the ESU and under consideration for the critical habitat designation. The CHART team did not identify any unoccupied habitat in this subbasin that may be essential for the conservation of the ESU.

Unit 10. Colusa Basin Subbasin (HU# 5520)

The Colusa Basin HU is located in the central portion of the ESU and includes portions of the mainstem Sacramento River, lower Butte Creek, and the Butte Creek-Sutter Bypass. This HU encompasses an area of approximately 2,767 mi² and occurs in

portions of Butte, Colusa, Glenn, Sutter, and Yolo Counties. The HU contains 5 HSAs, 3 of which are occupied, and 2,815 miles of streams (at 1:100,000 hydrography) although most of these stream miles are in unoccupied HSAs. Fish distribution and habitat use data compiled by NMFS biologists identify approximately 230 miles of occupied riverine habitat, including the Butte Creek/Sutter Bypass, in the 3 HSAs (NMFS 2004a). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F1 summarizes the total miles of occupied riverine and estuarine reaches identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F10 depicts the specific areas in this HU that are occupied by the ESU and under consideration for the critical habitat designation. The CHART team did not identify any unoccupied habitat areas in this subbasin that may be essential for the conservation of the ESU.

Unit 11. Butte Creek Subbasin (HU# 5521)

The Butte Creek HU is located in the northeastern portion of the ESU and portions of upper Butte Creek (see Map F11). This HU encompasses an area of approximately 207 mi² and occurs primarily in Butte County. The HU contains 3 HSAs, only one of which is occupied, and 310 miles of streams (at 1:100,000 hydrography), most of which is in the occupied HSA. Fish distribution and habitat use data compiled by NMFS biologists identify approximately 15 miles of occupied riverine habitat in the single occupied HSA (NMFS 2004a). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F1 summarizes the total miles of occupied riverine and estuarine reaches identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F11 depicts the specific areas in this HU that are occupied by the ESU and under consideration for the critical habitat designation.

The CHART team also concluded that inaccessible reaches of Upper Butte Creek above Centerville Dam upstream to Butte Meadow may be essential to the conservation of this ESU (NMFS 2004g). It is uncertain whether this area was historically used by the ESU, but spawning, rearing, and migration is present in the inaccessible areas and is thought to be in good condition. The team believed this area may be essential for conservation

because current spring run chinook and steelhead spawning in this watershed is all below an elevation of 1,000 ft and other spring-run chinook populations within the ESU typically spawn above 2,000 ft. High water temperatures in the lower portion of Butte Creek have led to significant spring-run chinook pre-spawning mortalities in recent years, and the team concluded that improved fish passage over the Centerville Diversion Dam would increase the range of this ESU and reduce the risk of adult losses in the lower stream reaches. The team expects that feasibility of passage at the Centerville Diversion Dam will be evaluated through the upcoming FERC relicensing process for the facility.

Unit 12. Ball Mountain Subbasin (HU# 5523)

The Ball Mountain HU is located in the northwestern portion of the ESU and includes a portion of upper Thomes Creek. This HU encompasses an area of approximately 334 mi² and occurs almost entirely in Tehama County. The HU contains 3 HSAs, only 1 of which is occupied, and 521 miles of streams (at 1:100,000 hydrography), most of which is in the Thomes Creek watershed. Fish distribution and habitat use data compiled by NMFS biologists identify approximately 15 miles of occupied riverine habitat in the one occupied HSA (NMFS 2004a). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F1 summarizes the total miles of occupied riverine reaches identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F12 depicts the specific areas in this HU that are occupied by the ESU and under consideration for the critical habitat designation. The CHART team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of this ESU.

Unit 13. Shasta Bally Subbasin (HU# 5524)

The Shasta Bally HU is located in the northwestern portion of the ESU and includes portions of the South Fork Cottonwood Creek and Beegum Creek. This HU encompasses an area of approximately 905 mi² and occurs primarily in Shasta and Tehama Counties. The HU contains 9 HSAs, 4 of which are occupied, and approximately 1,003 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 50 miles of occupied riverine habitat in the 4 HSAs (NMFS 2004a). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs.

Table F1 summarizes the total miles of occupied riverine reaches identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F13 depicts the specific areas in this HU that are occupied by the ESU and under consideration for the critical habitat designation. The CHART team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of this ESU.

Unit 14. North Diablo Range Subbasin (HU# 5543)

The North Diablo Range HU is located in the southernmost portion of the and includes only a small portion of the south-central Delta. This HU encompasses an area of approximately 315 mi² and occurs primarily in Alameda, Contra Costa, and San Joaquin Counties. The HU contains only a single HSA which is partially occupied, and 336 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify only approximately 4 miles of occupied riverine/estuarine habitat in this HSA (NMFS 2004a). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F1 summarizes the total miles of occupied riverine and estuarine reaches identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F10 depicts the specific areas in this HU that are occupied by the ESU and under consideration for the critical habitat designation. The CHART team did not identify any unoccupied habitat areas in this subbasin that may be essential for the conservation of the ESU.

Unit 15. San Joaquin Delta Subbasin (HU# 5544)

The San Joaquin Delta HU is located in the southernmost portion of the ESU and includes portions of the central and south Delta. This HU encompasses an area of approximately 628 mi² and occurs primarily in Contra Costa and San Joaquin counties. The HU contains a single HSA which is occupied, and approximately 455 miles of streams and channels (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 142 miles of occupied riverine/estuarine habitat in this HSA (NMFS 2004a). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F1 summarizes the total miles of occupied riverine and estuarine reaches identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F15 depicts

the specific areas in this HU that are occupied by the ESU and under consideration for the critical habitat designation. The CHART team did not identify any unoccupied habitat areas in this subbasin that may be essential for the conservation of the ESU.

Unit 16. Suisun Bay (HU# 2207), San Pablo Bay (HU#2206) and San Francisco Bay (HU#s 2203 and 2204)

Portions of four HUs (2207, 2206, 2203, 2204) comprise the Suisun Bay-San Pablo-San Francisco Bay complex that is utilized by this ESU. These 4 HUs contain both estuarine habitat in the Bay complex as well as freshwater tributaries to the Bay complex, but only the 4 HSAs (HSAs: 220710, 220610, 220410, and 220312) that comprise the estuarine Bay complex are occupied by this ESU. These 4 HSAs encompass approximately 427 mi² of estuarine habitat that serves as a rearing and migratory corridor providing connectivity between freshwater spawning, rearing, and migratory habitats for this ESU in the Sacramento-San Joaquin basin and the ocean. The team concluded that these four HSAs were occupied and contained PCEs for migratory habitat that support this ESU, and identified management activities that may affect the PCEs (Table F1). Map F16 depicts the specific HSAs in this complex which are occupied and thus under consideration for the critical habitat designation. The team did not identify any unoccupied areas in the San Francisco Bay-San Pablo-Suisun Bay complex that may be essential for the conservation of this ESU.

Unoccupied Habitat Outside the ESU Range that May be Essential to ESU Conservation

The CHART team identified several unoccupied habitat areas in the Central Valley that are outside the current range of the CV spring-run chinook ESU, but that may be essential for its conservation (NMFS 2004g). These unoccupied areas are described below:

(1) Lower and Upper Mokelumne River. The team concluded that currently unoccupied portions of the Lower Mokelumne River from its confluence with the San Joaquin River upstream to Comanche Dam may be essential for the conservation of this ESU. In addition, the team concluded that inaccessible reaches of the Upper Mokelumne River above Comanche Dam up to Bald Rock Falls (which is 7 miles above Electra Dam) may be essential to the conservation of this ESU. The Mokelumne River historically supported large runs of spring run chinook salmon (Yoshiyama et al., 1995) which have been extirpated. The lower portion of the Mokelumne River would be essential as a

migratory corridor for spring chinook access to the upper watershed above Comanche Dam. Suitable habitat exists above Comanche Dam, but it has been altered by Comanche and Pardee reservoirs. The Central Valley Technical Recovery Team identifies this as a historically independent population and indicates that multiple independent populations of this ESU distributed throughout the Central Valley may be required to recover this ESU.

(2) Lower and Middle Stanislaus River. The team concluded that currently unoccupied reaches of the Lower Stanislaus River from its confluence with the San Joaquin River up to Goodwin Dam may be essential for the conservation of this ESU. The team also concluded that inaccessible habitat reaches in the Middle Stanislaus River from Goodwin Dam to New Melones Dam may be essential to the conservation of this ESU. The Stanislaus River historically supported a large population of spring-run chinook salmon (McEwan 1996; Yoshiyama 1996) which was extirpated with the construction of Goodwin Dam. The lower portion of the Stanislaus River would be essential as a migratory corridor for spring chinook access to the upper watershed above Goodwin Dam. Depending upon dam operations and resulting instream water temperatures, rearing and spawning habitat might be available in this lower reach. Suitable habitat exists above Goodwin Dam and fish passage at the Dam is thought to be feasible. The Central Valley Technical Recovery Team identifies this as a historically independent population and indicates that multiple independent populations of this ESU distributed throughout the Central Valley may be required to recover this ESU.

(3) Lower and Middle Tuolumne River. The team concluded that currently unoccupied reaches of the Lower Tuolumne River from its confluence with the San Joaquin River up to LaGrange Dam may be essential for the conservation of this ESU. The team also concluded that inaccessible habitat reaches in the Middle Tuolumne River between LaGrange and New Don Pedro Dams may be essential to the conservation of this ESU. The Tuolumne River historically supported a large population of spring-run chinook salmon (McEwan 1996; Yoshiyama 1996) which was extirpated with the construction of LaGrange Dam. The lower portion of the Stanislaus River would be essential as a migratory corridor for spring chinook access to the upper watershed above LaGrange Dam. Depending upon dam operations and resulting instream water temperatures, rearing and spawning habitat might be available in this lower reach. Suitable habitat is thought to exist above LaGrange Dam for this ESU although feasibility of providing passage above the dam is uncertain. The Central Valley Technical Recovery Team

identifies this as a historically independent population that is now extirpated and indicates that multiple independent populations of this ESU distributed throughout the Central Valley may be required to recover this ESU.

(4) Lower and Middle Merced River. The team concluded that currently unoccupied reaches of the Lower Merced River from its confluence with the San Joaquin River up to Crocker-Huffman Dam may be essential for the conservation of this ESU. The team also concluded that inaccessible habitat reaches in the Middle Merced River between Crocker-Huffman and Exchequer Dams may be essential to the conservation of this ESU. The Merced River historically supported a large population of spring-run chinook salmon (Yoshiyama 1996) which was extirpated with the construction of Crocker-Huffman Dam. The lower portion of the Merced River would be essential as a migratory corridor for spring-chinook access to the upper watershed above Crocker-Huffman Dam. Depending upon dam operations and resulting instream water temperatures, rearing and spawning habitat might be available in this lower reach. Suitable habitat is thought to exist above Crocker-Huffman Dam for this ESU although passage at the Dam is thought to be feasible because of its low height. The Central Valley Technical Recovery Team identifies this as a historically independent population that is now extirpated and indicates that multiple independent populations of this ESU distributed throughout the Central Valley may be required to recover this ESU.

CHART Preliminary Conservation Value Rating

Freshwater/Estuarine Areas

After reviewing the best available scientific data regarding critical habitat for this ESU, the CHART concluded that most of the occupied HSAs were of high or medium conservation value to the ESU. Of the 37 occupied HSAs that were evaluated, 25 were rated as having high conservation value, 4 were rated as having medium conservation value, and 8 were rated as having low conservation value. Table F2 summarizes the CHARTs PCE/watershed scores and preliminary conservation value ratings (i.e. low, medium or high) for each occupied HSA. Map F17 shows the overall spatial distribution of conservation ratings (i.e. low, medium and high) for occupied HSAs within the freshwater/estuarine range of the ESU.

Marine Areas

NMFS determined that marine areas did not warrant consideration as critical habitat for this ESU.

References and Sources of Information

NMFS 2003a. Updated Status of Federally Listed ESUs of West Coast Salmon and Steelhead. West Coast Salmon Biological Review Team; Northwest Fisheries Science Center and Southwest Fisheries Science Center. July 2003.

NMFS 2003b. Hatchery Broodstock Summaries and Assessments for Chum, Coho, and Chinook Salmon and Steelhead Stocks within ESUs listed under the ESA. Salmon and Steelhead Hatchery Assessment Group/NOAA Fisheries; Northwest Fisheries Science Center and Southwest Fisheries Science Center.

NMFS 2004. Population Structure of threatened and endangered chinook salmon ESU in California's Central Valley. NOAA-TM-NMFS-SWFSC-370.

NMFS 2004a. GIS and Associated Data Related to Critical Habitat Designations for Seven ESUs of Salmon and *O. mykiss* in California. Compiled by NMFS, Southwest Region

Federal Register Notices

64 FR 50394 - CV spring run chinook Listing Determination

69 FR 33102 - Proposed Listing Determinations for 27 West Coast Salmon and Steelhead ESUs

Table F1. Summary of Occupied Subbasins/Watersheds, PCE's, and Management Activities Affecting PCE's for the Central Valley Spring-run Chinook ESU

| Map Code | Basin | Watershed | Calwater Unit | Spawning/Rearing PCEs (mi) | Rearing/Migration PCEs (mi) | Presence/Migration Only PCEs (mi) | Management Activities* |
|----------|--------------------|---------------------|---------------|----------------------------|-----------------------------|-----------------------------------|----------------------------|
| | San Francisco Bay | Bay Waters | 220312 | - | | | AW, PP, IS, DK, BS, ID |
| | San Francisco Bay | Bay Channel | 220410 | | | | AW, PP, IS, DK, BS, ID |
| | San Francisco Bay | San Pablo Bay | 220610 | | | | AW, PP, IS, DK, BS, ID |
| | Suisun Bay | Suisun Bay | 220710 | | | | AW, PP, IS, DK, BS, WE, ID |
| | Suisun Bay | Benicia | 220721 | | | | |
| | Suisun Bay | Suisun Creek | 220722 | | | | |
| | Suisun Bay | Suisun Slough | 220723 | | | | |
| | Suisun Bay | Grizzly Island | 220724 | | | | |
| | Suisun Bay | Pittsburg | 220731 | | | | |
| | Suisun Bay | Walnut Creek | 220732 | | | | |
| | Suisun Bay | Martinez | 220733 | | | | |
| | Tehama | Lower Slough Creek | 550410 | 23 | 23 | 23 | AW, FP, DO |
| | Tehama | Red Bluff | 550420 | 229 | 229 | 229 | AW, PP, DK, BS, UD, RM |
| | Whitmore | Inks Creek | 550711 | 2 | 2 | 2 | RM |
| | Whitmore | Battle Creek | 550712 | 40 | 40 | 40 | AW, FP, WD |
| | Whitmore | Ash Creek | 550721 | | | | |
| | Whitmore | Inwood | 550722 | 6 | 6 | 6 | AW, MW, UD |
| | Whitmore | South Cow Creek | 550731 | 10 | 10 | 10 | AW, FM, RM |
| | Whitmore | Old Cow Creek | 550732 | | | | |
| | Whitmore | Little Cow Creek | 550733 | | | | |
| | Redding | Enterprise Flat | 550810 | 98 | 98 | 98 | WS, DO, FP, PP, GM, RM |
| | Redding | Lower Cottonwood | 550820 | 61 | 61 | 61 | AW, FP, RM |
| | Eastern Tehama | Big Chico Creek | 550914 | 9 | 9 | 9 | FP, FM, RM, RD |
| | Eastern Tehama | Mud Creek | 550915 | | | | |
| | Eastern Tehama | Pine Creek | 550916 | | | | |
| | Eastern Tehama | Deer Creek | 550920 | 35 | 35 | 35 | FM, RM |
| | Eastern Tehama | Big Dry Creek | 550941 | | | | |
| | Eastern Tehama | Upper Mill Creek | 550942 | 47 | 47 | 47 | FM, RM |
| | Eastern Tehama | Dye Creek | 550962 | | | | |
| | Eastern Tehama | Antelope Creek | 550963 | 25 | 25 | 25 | FM, FP, AW, RM |
| | Eastern Tehama | Paynes Creek | 550964 | | | | |
| | Eastern Tehama | Salt Creek | 550965 | | | | |
| | Sacramento Delta | Sacramento Delta | 551000 | 153 | 180 | 180 | AW, PP, IS, DK, BS |
| | Valley Putah-Cache | Elmira | 551110 | | | | |
| | Valley Putah-Cache | Lower Putah Creek | 551120 | 16 | 16 | 16 | |
| | Marysville | Lower Bear River | 551510 | | | | |
| | Marysville | Lower Yuba River | 551530 | 19 | 19 | 19 | AW, MW, PP, DK, BS, FP |
| | Marysville | Lower Feather River | 551540 | 40 | 40 | 40 | WD, WS, PP, HM, DO |
| | Yuba River | Browns Valley | 551712 | 17 | 17 | 17 | AW, MW |
| | Yuba River | Mildred Lake | 551713 | 0.4 | 0.4 | 0.4 | AW, MW |
| | Yuba River | Englebright | 551714 | 1 | 1 | 1 | AW, FP, DO, |
| | Yuba River | Nevada City | 551720 | 4 | 4 | 4 | AW |
| | Yuba River | South Honcut Creek | 551760 | | | | |
| | Valley-American | Franklin | 551911 | | | | |
| | Valley-American | | 551912 | | | | |
| | Valley-American | Lower American | 551921 | 10 | 10 | 10 | AW, MW, WS, UD, HM, DO, PP |
| | Valley-American | Pleasant Grove | 551922 | 47 | 47 | 47 | AW, FP, PP, DK, BS |
| | Colusa Basin | Sycamore-Sutter | 552010 | 83 | 83 | 83 | AW, HR, PP, DK, BS |
| | Colusa Basin | Colusa Trough | 552021 | | | | |
| | Colusa Basin | Orland | 552022 | | | | |
| | Colusa Basin | Sutter Bypass | 552030 | 70 | 70 | 70 | AW, IS, DK, BS, FP, WH |
| | Colusa Basin | Butte Basin | 552040 | 76 | 76 | 76 | AW, FP, PP, DK, BS |
| | Butte Creek | Upper Dry Creek | 552110 | | | | |
| | Butte Creek | Upper Butte Creek | 552120 | | | | |
| | Butte Creek | Upper Little Chico | 552130 | 15 | 15 | 15 | WD |
| | Bull Mountain | Thomes Creek | 552310 | 15 | 15 | 15 | RM |
| | Bull Mountain | Elder Creek | 552321 | | | | |
| | Bull Mountain | Red Bank Creek | 552322 | | | | |

| | | | | | | |
|--------------------|--------------------|--------|-----|-----|-----|------------------------|
| Shasta Bally | South Fork | 552433 | 22 | 22 | 22 | FM, RM, RD |
| Shasta Bally | Wells Creek | 552434 | | | | |
| Shasta Bally | Ono | 552435 | | | | |
| Shasta Bally | Platina | 552436 | 19 | 19 | 19 | FM, RM, RD |
| Shasta Bally | Spring Creek | 552440 | 2 | 2 | 2 | WD, WS, FP, PP, HM, DO |
| Shasta Bally | Whiskeytown Lake | 552461 | | | | |
| Shasta Bally | Kanaka Peak | 552462 | 7 | 7 | 7 | HR, GM, WD, WS, DO |
| Shasta Bally | Middle Clear | 552463 | | | | |
| Shasta Bally | French Gulch | 552464 | | | | |
| North Diablo Range | North Diablo Range | 554300 | 4 | 4 | 4 | AW, MW, IS, PP |
| San Joaquin Delta | San Joaquin Delta | 554400 | 142 | 142 | 142 | AW, MW, PP, IS, EF |

*Management Activities Codes:

AP - Adult passage
 AW - Agricultural water withdrawals
 BS - Streambank stabilization for flood control
 DK - Diking
 DO - Dam operations
 EF - Entrainment and flow alterations
 FM - Forest management
 FP - Fish passage

GM - Gravel mining
 HM - Hatchery management
 HR - Habitat restoration
 ID - Industrial development
 IS - Invasive/non-native species
 MW - Municipal water withdrawals
 PP - Point and non-point water pollution
 RD - Roads

RM - Rangeland management
 SF - Seasonal flooding for flood control
 UD - Urban development
 WD - Water diversion for hydroelectric
 WE - Wetland/Estuary management
 WH - Wildlife habitat management
 WS - Water storage for flood control

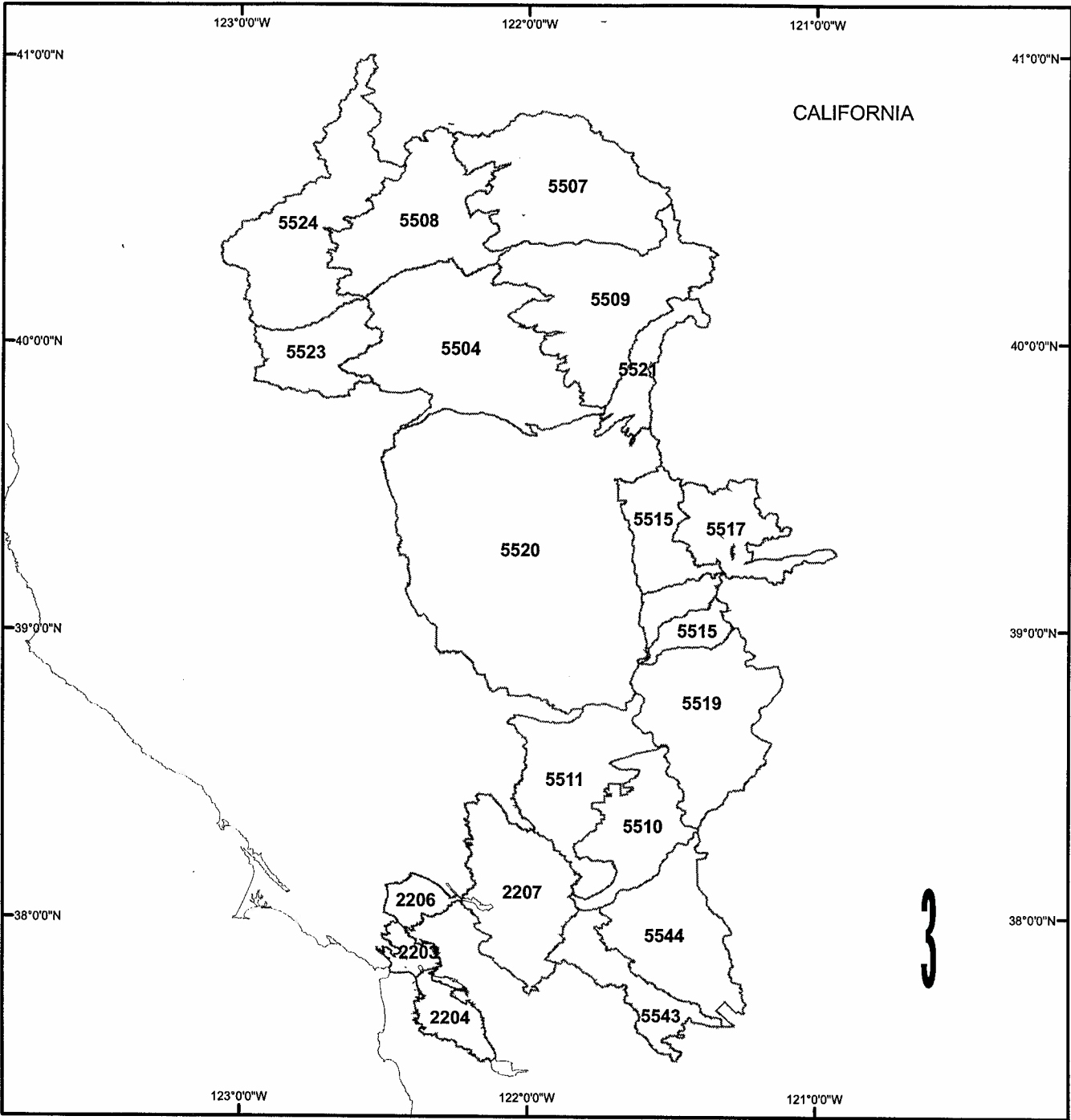
Table F2. Summary of Preliminary Scores and Overall Rankings of Conservation Values for Critical Habitat for HSA watersheds occupied by the Central Valley Spring-run Chinook ESU

| Map Code | Basin | Watershed | Calwater Unit | Total Score (0-18) | Comments / Other Considerations | Preliminary Conservation Value |
|----------|--------------------|---------------------|---------------|--------------------|---|--------------------------------|
| | San Francisco Bay | Bay Waters | 220312 | 10 | | High |
| | San Francisco Bay | Bay Channel | 220410 | 5 | | Low |
| | San Francisco Bay | San Pablo Bay | 220610 | 10 | | High |
| | Suisun Bay | Suisun Bay | 220710 | 10 | | High |
| | Suisun Bay | Benicia | 220721 | 0 | | Not Occupied |
| | Suisun Bay | Suisun Creek | 220722 | 0 | | Not Occupied |
| | Suisun Bay | Suisun Slough | 220723 | 0 | | Not Occupied |
| | Suisun Bay | Grizzly Island | 220724 | 0 | | Not Occupied |
| | Suisun Bay | Pittsburg | 220731 | 0 | | Not Occupied |
| | Suisun Bay | Walnut Creek | 220732 | 0 | | Not Occupied |
| | Suisun Bay | Martinez | 220733 | 0 | | Not Occupied |
| | Tehama | Lower Stony Creek | 550410 | 7 | | Medium |
| | Tehama | Red Bluff | 550420 | 15 | | High |
| | Whitmore | Inks Creek | 550711 | 5 | | Low |
| | Whitmore | Battle Creek | 550712 | 16 | | High |
| | Whitmore | Ash Creek | 550721 | 0 | | Not Occupied |
| | Whitmore | Inwood | 550722 | 5 | | Low |
| | Whitmore | South Cow Creek | 550731 | 3 | | Low |
| | Whitmore | Old Cow Creek | 550732 | 0 | | Not Occupied |
| | Whitmore | Little Cow Creek | 550733 | 0 | | Not Occupied |
| | Redding | Enterprise Flat | 550810 | 13 | | High |
| | Redding | Lower Cottonwood | 550820 | 8 | Initially considered moderate, changed to High based on recommendations by the CVTRT to assign high conservation values to any streams in CV that are utilized for spawning or early rearing. | High |
| | Eastern Tehama | Big Chico Creek | 550914 | 12 | | High |
| | Eastern Tehama | Mud Creek | 550915 | 0 | | Not Occupied |
| | Eastern Tehama | Pine Creek | 550916 | 0 | | Not Occupied |
| | Eastern Tehama | Deer Creek | 550920 | 17 | | High |
| | Eastern Tehama | Big Dry Creek | 550941 | 0 | | Not Occupied |
| | Eastern Tehama | Upper Mill Creek | 550942 | 17 | | High |
| | Eastern Tehama | Dye Creek | 550962 | 0 | | Not Occupied |
| | Eastern Tehama | Antelope Creek | 550963 | 11 | Initially considered moderate, changed to High based on recommendations by the CVTRT to assign high conservation values to any streams in CV that are utilized for spawning or early rearing. | High |
| | Eastern Tehama | Paynes Creek | 550964 | 0 | | Not Occupied |
| | Eastern Tehama | Salt Creek | 550965 | 0 | | Not Occupied |
| | Sacramento Delta | Sacramento Delta | 551000 | 14 | | High |
| | Valley Putah-Cache | Elmira | 551110 | 0 | | Not Occupied |
| | Valley Putah-Cache | Lower Putah Creek | 551120 | 11 | | High |
| | Marysville | Lower Bear River | 551510 | 0 | | Not Occupied |
| | Marysville | Lower Yuba River | 551530 | 13 | | High |
| | Marysville | Lower Feather River | 551540 | 11 | Initially considered moderate, changed to High based on recommendations by the CVTRT to assign high conservation values to any streams in CV that are utilized for spawning or early rearing. | High |
| | Yuba River | Browns Valley | 551712 | 14 | | High |
| | Yuba River | Mildred Lake | 551713 | 5 | | Low |
| | Yuba River | Englebright | 551714 | 12 | | High |
| | Yuba River | Nevada City | 551720 | 7 | | Medium |
| | Yuba River | South Honcut Creek | 551760 | 0 | | Not Occupied |

| | | | | | | |
|--|--------------------|--------------------|--------|----|---|--------------|
| | Valley-American | Franklin | 551911 | 0 | - | Not Occupied |
| | | | 551912 | 0 | | Not Occupied |
| | Valley-American | Lower American | 551921 | 7 | | Medium |
| | Valley-American | Pleasant Grove | 551922 | 10 | Initially considered moderate, changed to High based on recommendations by the CVTRT to assign high conservation values to any streams in CV that are utilized for spawning or early rearing. | High |
| | Colusa Basin | Sycamore-Sutter | 552010 | 12 | | High |
| | Colusa Basin | Colusa Trough | 552021 | 5 | | High |
| | Colusa Basin | Orland | 552022 | 0 | | Not Occupied |
| | Colusa Basin | Sutter Bypass | 552030 | 15 | | High |
| | Colusa Basin | Butte Basin | 552040 | 16 | | High |
| | Butte Creek | Upper Dry Creek | 552110 | 0 | | Not Occupied |
| | Butte Creek | Upper Butte Creek | 552120 | 0 | | Not Occupied |
| | Butte Creek | Upper Little Chico | 552130 | 15 | | High |
| | Bull Mountain | Thomes Creek | 552310 | 5 | | Low |
| | Bull Mountain | Elder Creek | 552321 | 0 | | Not Occupied |
| | Bull Mountain | Red Bank Creek | 552322 | 0 | | Not Occupied |
| | Shasta Bally | South Fork | 552433 | 3 | | Low |
| | Shasta Bally | Wells Creek | 552434 | 0 | | Not Occupied |
| | Shasta Bally | Ono | 552435 | 0 | | Not Occupied |
| | Shasta Bally | Platina | 552436 | 11 | Initially considered moderate, changed to High based on recommendations by the CVTRT to assign high conservation values to any streams in CV that are utilized for spawning or early rearing. | High |
| | Shasta Bally | Spring Creek | 552440 | 12 | | High |
| | Shasta Bally | Whiskeytown Lake | 552461 | 0 | | Not Occupied |
| | Shasta Bally | Kanaka Peak | 552462 | 12 | | High |
| | Shasta Bally | Middle Clear | 552463 | 0 | | Not Occupied |
| | Shasta Bally | French Gulch | 552464 | 0 | | Not Occupied |
| | North Diablo Range | North Diablo Range | 554300 | 8 | | Medium |
| | San Joaquin Delta | San Joaquin Delta | 554400 | 5 | | Low |



Figures A1 and A2: CALWATER Hydrologic Units and Hydrologic Subareas within the range of the Central Valley spring-run chinook ESU

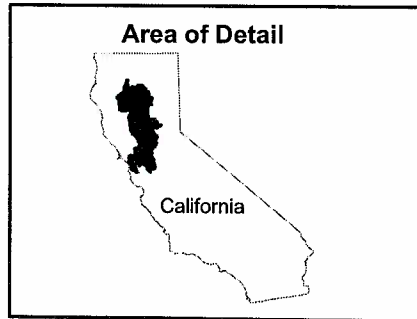
Map of the Central Valley Spring- run O. tshawytscha ESU



Map of the Central Valley Spring- run O. tshawytscha ESU



-  Subbasin Boundaries
 State Boundaries



Maps F1 through F16: Central Valley spring run chinook ESU - Areas (Units) Under
Consideration for Critical Habitat Designation

F1 - Unit 5504 (Tehama HU)

F2 - Unit 5507 (Whitmore HU)

F3 - Unit 5508 (Redding HU)

F4 - Unit 5509 (Eastern Tehama HU)

F5 - Unit 5510 (Sacramento Delta HU)

F6 - Unit 5511 (Valley Putah-Cache HU)

F7 - Unit 5515 (Marysville HU)

F8 - Unit 5517 (Yuba River HU)

F9 - Unit 5519 (Valley-American HU)

F10 - Unit 5520 (Colusa Basin HU)

F11 - Unit 5521 (Butte Creek HU)

F12 - Unit 5523 (Ball Mountain HU)

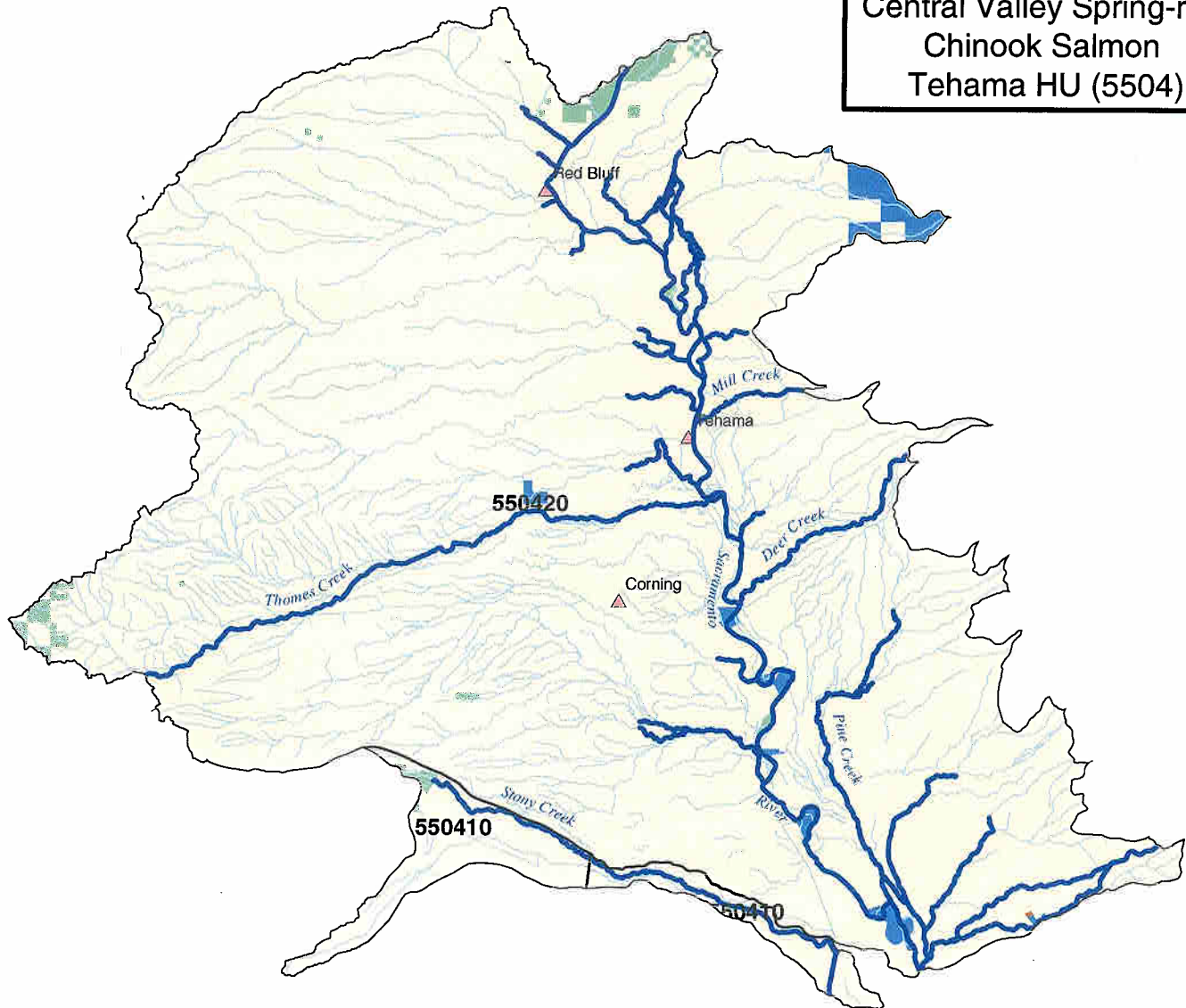
F13 - Unit 5524 (Shasta Bally HU)

F14 - Unit 5543 (North Diablo Range HU)

F15 - Unit 5544 (San Joaquin HU)

F16 - San Francisco-San Pablo-Suisun Bay Unit

DRAFT
Land Ownership
Central Valley Spring-run
Chinook Salmon
Tehama HU (5504)



- △ Cities
- ~ Chinook Presence Streams
- Hydrologic Unit Boundary

Land Ownership*

- Tribal
- Federal
- State/Local
- Private/Other
- Water

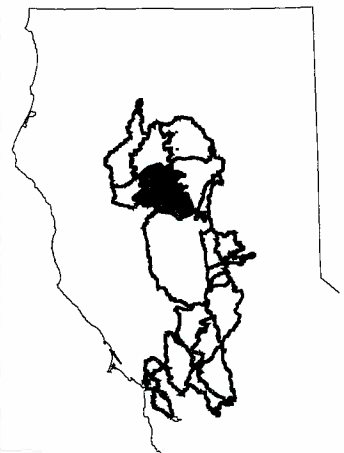
*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is a DRAFT product for general reference only

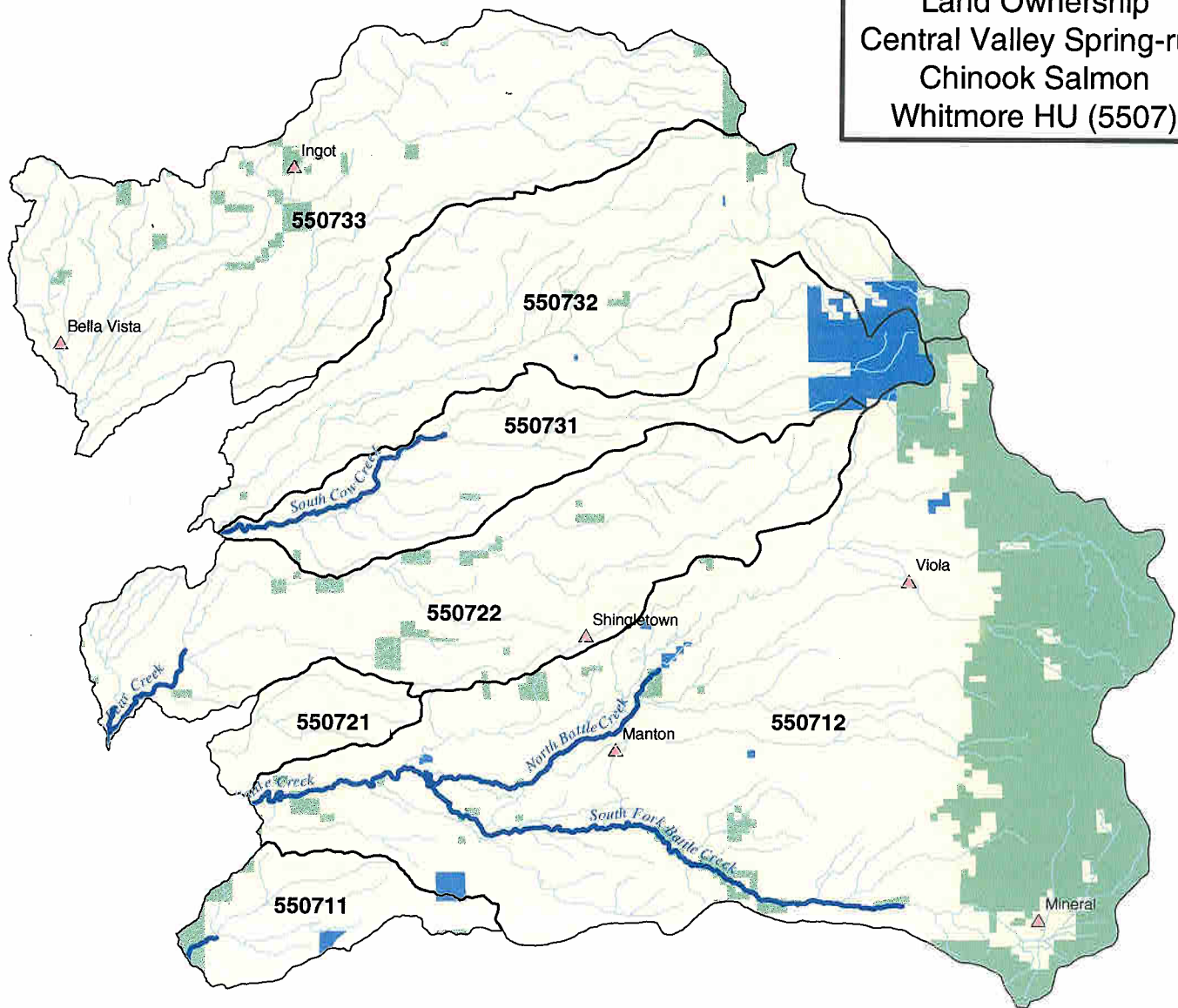


0 2.5 5 Miles

Central Valley
Spring-run
Chinook Salmon ESU

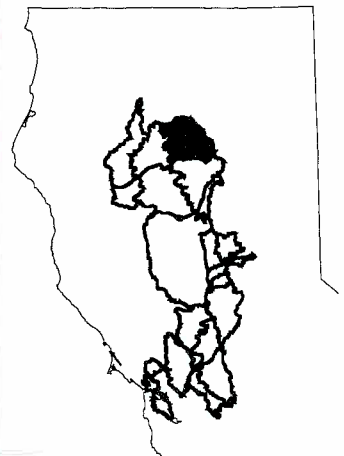


DRAFT
Land Ownership
Central Valley Spring-run
Chinook Salmon
Whitmore HU (5507)

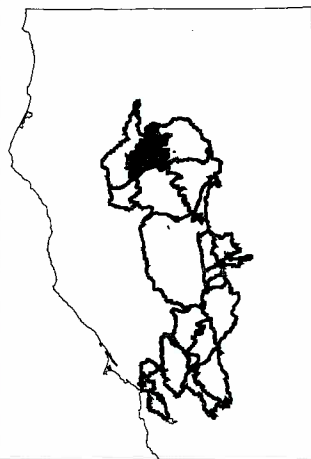


Note: This map is a DRAFT product for general reference only

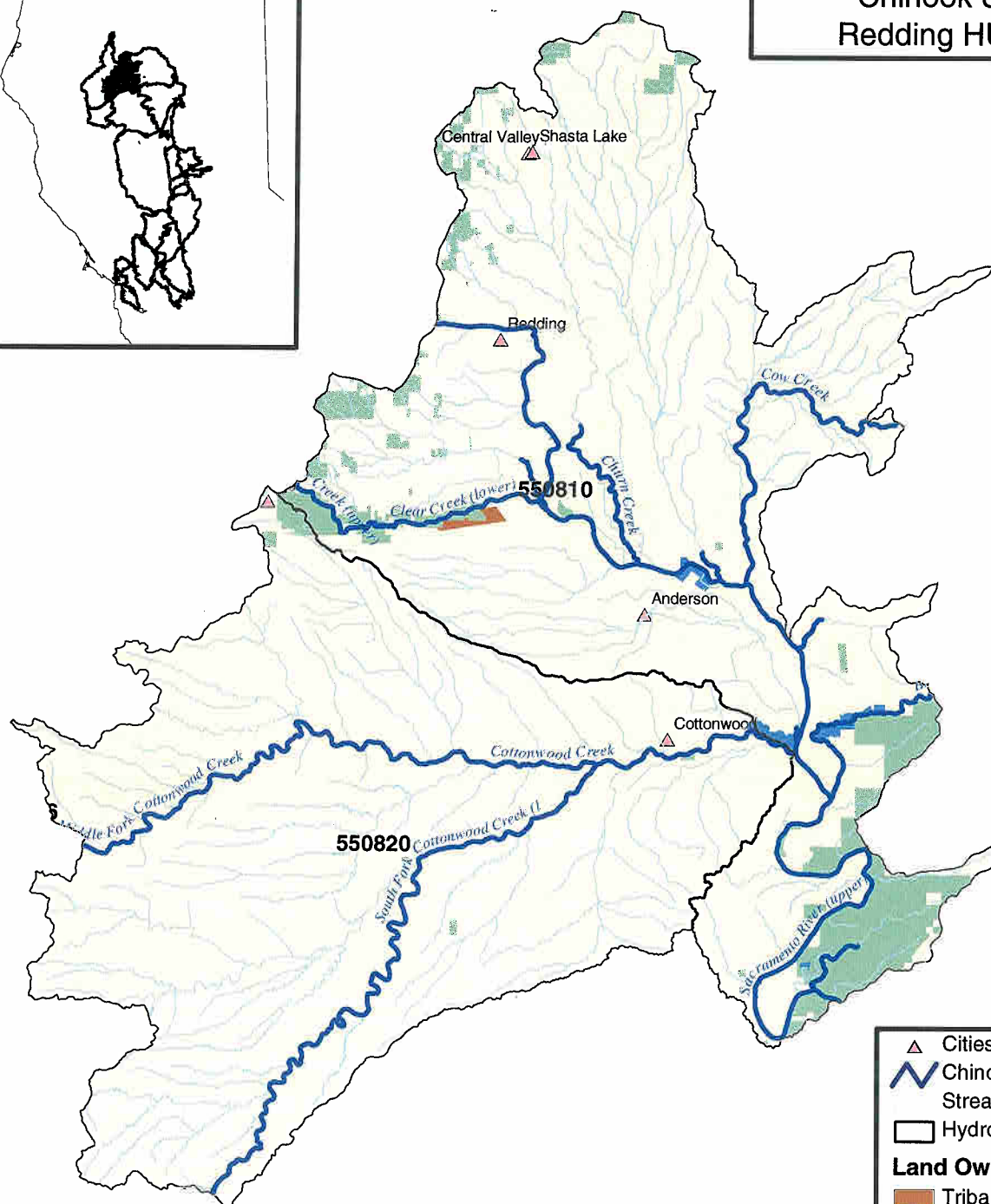
Central Valley Spring-run
Chinook Salmon ESU



Central Valley
Spring-run
Chinook Salmon ESU



DRAFT
Land Ownership
Central Valley Spring-run
Chinook Salmon
Redding HU (5508)



- △ Cities
 - ▬ Chinook Presence Streams
 - ▭ Hydrologic Unit Boundary
 - Land Ownership***
 - ▭ Tribal
 - ▭ Federal
 - ▭ State/Local
 - ▭ Private/Other
 - ▭ Water
- *Source: California Environmental Resources Evaluation System (CERES), 1999



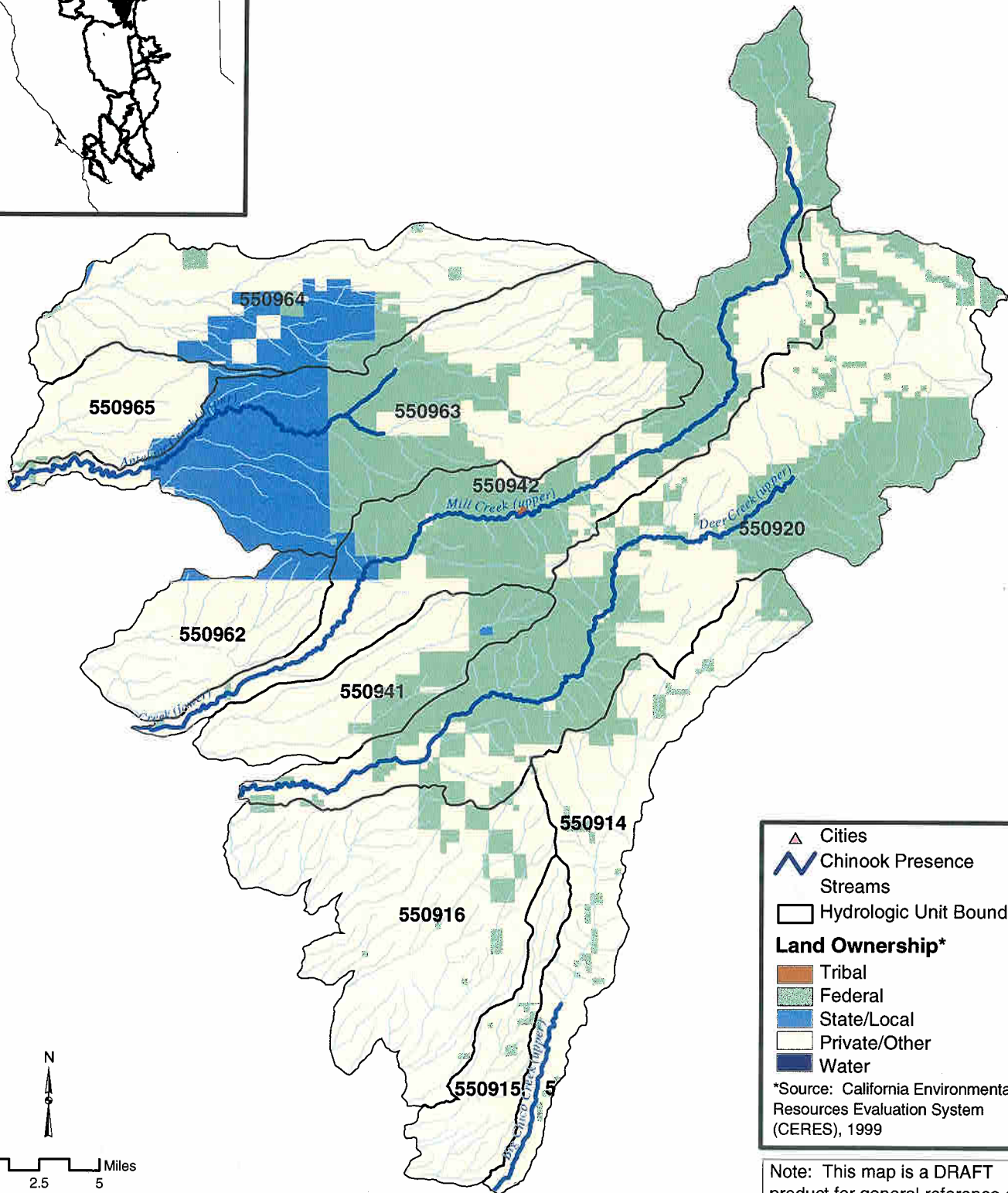
0 2.5 Miles

Note: This map is a DRAFT product for general reference only

Central Valley
Spring-run
Chinook Salmon ESU



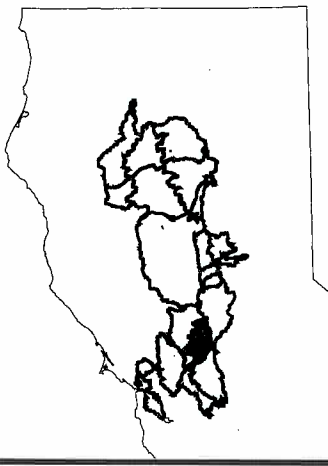
DRAFT
Land Ownership
Central Valley Spring-run
Chinook Salmon
Eastern Tehama HU (5509)



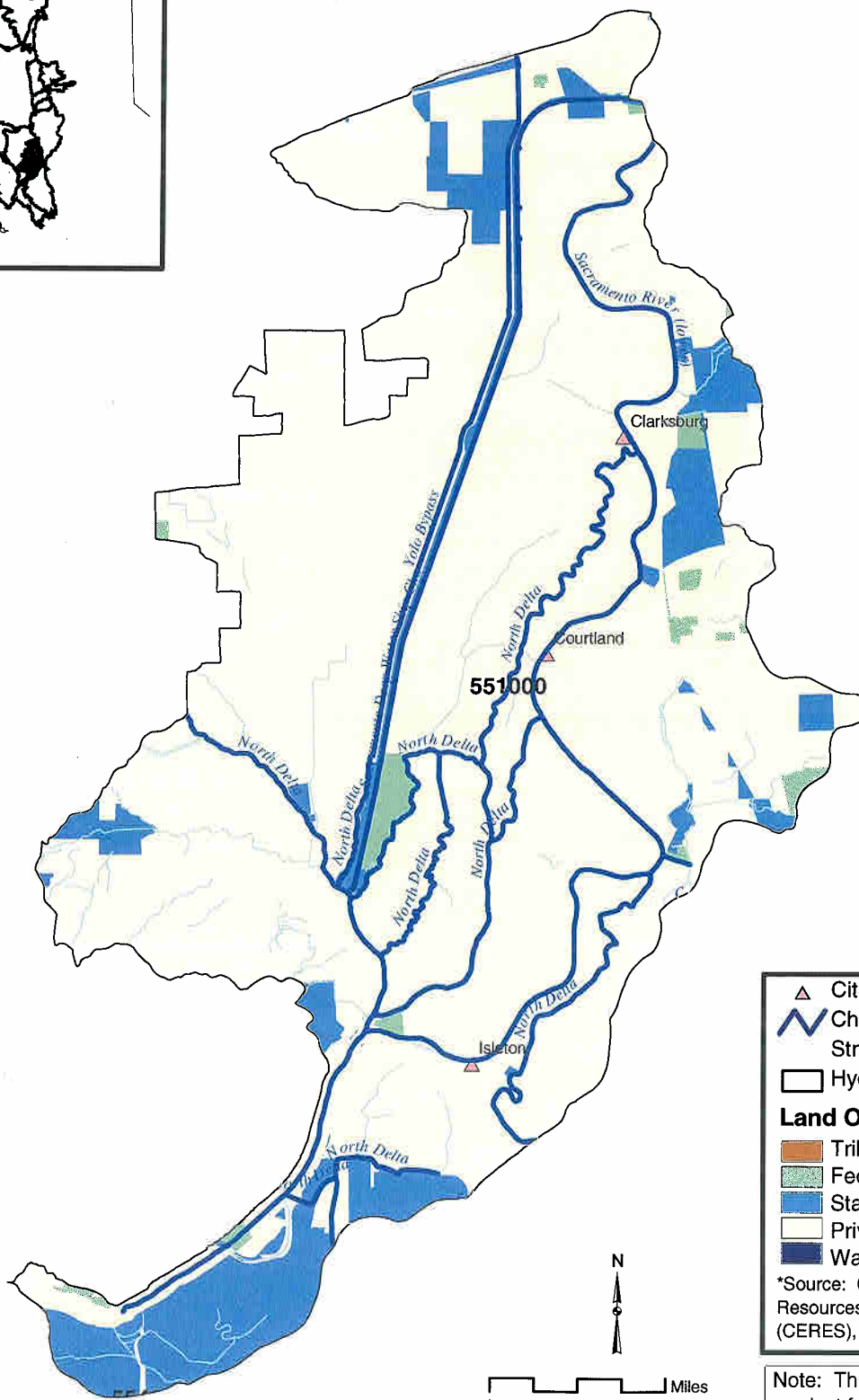
- △ Cities
 - ▬ Chinook Presence Streams
 - ▭ Hydrologic Unit Boundary
 - Land Ownership***
 - ▭ Tribal
 - ▭ Federal
 - ▭ State/Local
 - ▭ Private/Other
 - ▭ Water
- *Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is a DRAFT product for general reference only

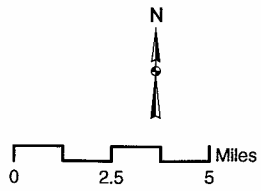
Central Valley
Spring-run
Chinook Salmon ESU



DRAFT
Land Ownership
Central Valley Spring-run
Chinook Salmon
Sacramento Delta HU (55100)

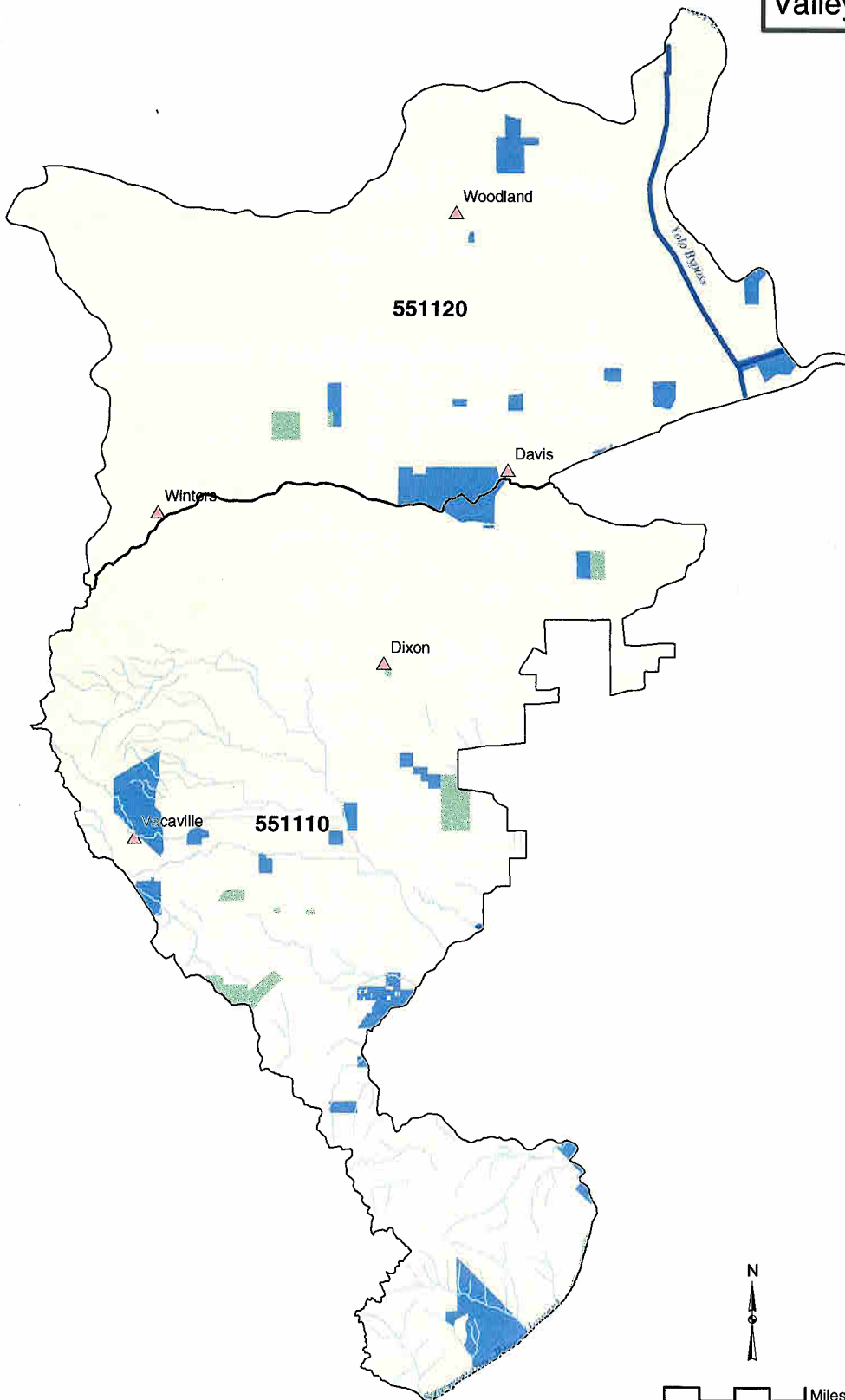
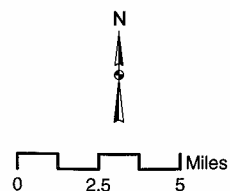
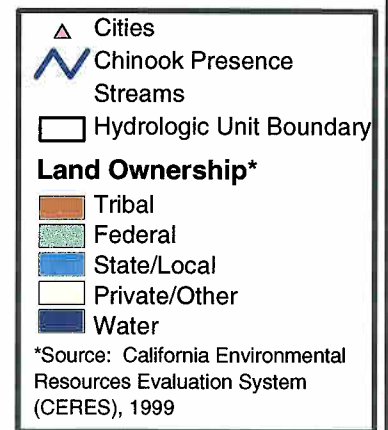
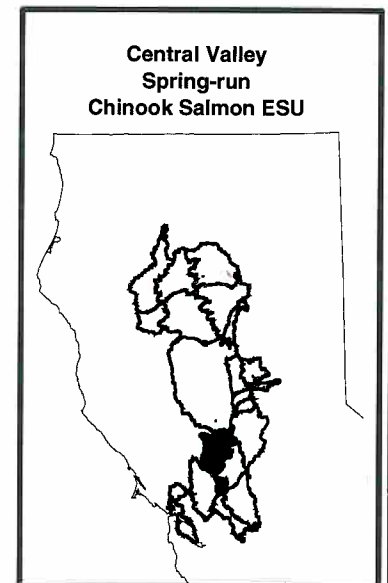


▲ Cities
 Chinook Presence Streams
 Hydrologic Unit Boundary
Land Ownership*
 Tribal
 Federal
 State/Local
 Private/Other
 Water
 *Source: California Environmental Resources Evaluation System (CERES), 1999



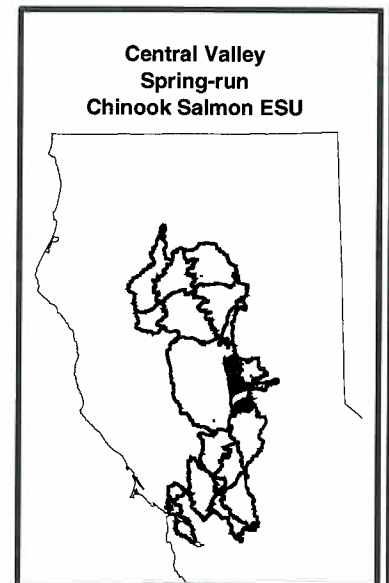
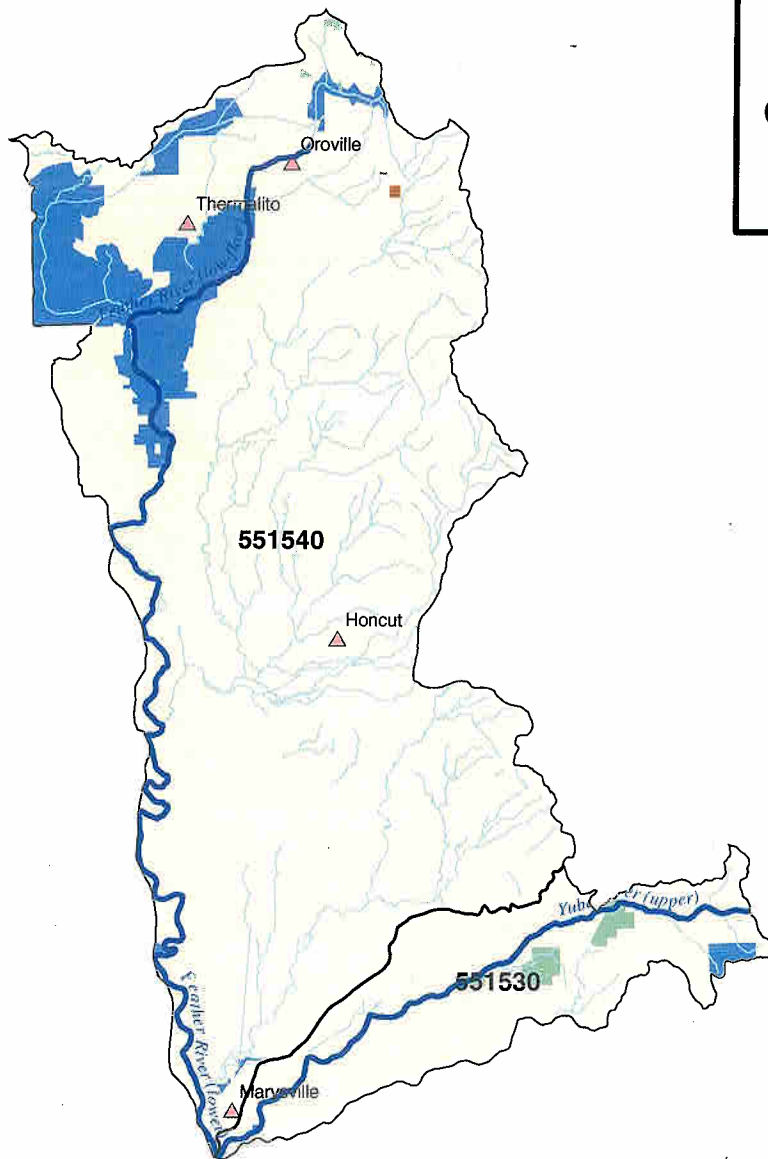
Note: This map is a DRAFT product for general reference only

DRAFT
Land Ownership
Central Valley Spring-run
Chinook Salmon
Valley Putah-Cache HU (5511)



Note: This map is a DRAFT product for general reference only

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Land Ownership
Central Valley Spring-run
Chinook Salmon
Marysville HU (5515)



- △ Cities
- Chinook Presence
- Streams
- Hydrologic Unit Boundary

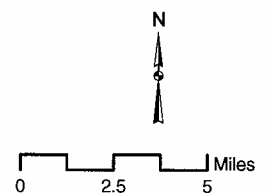
Land Ownership*

- Tribal
- Federal
- State/Local
- Private/Other
- Water

*Source: California Environmental Resources Evaluation System (CERES), 1999

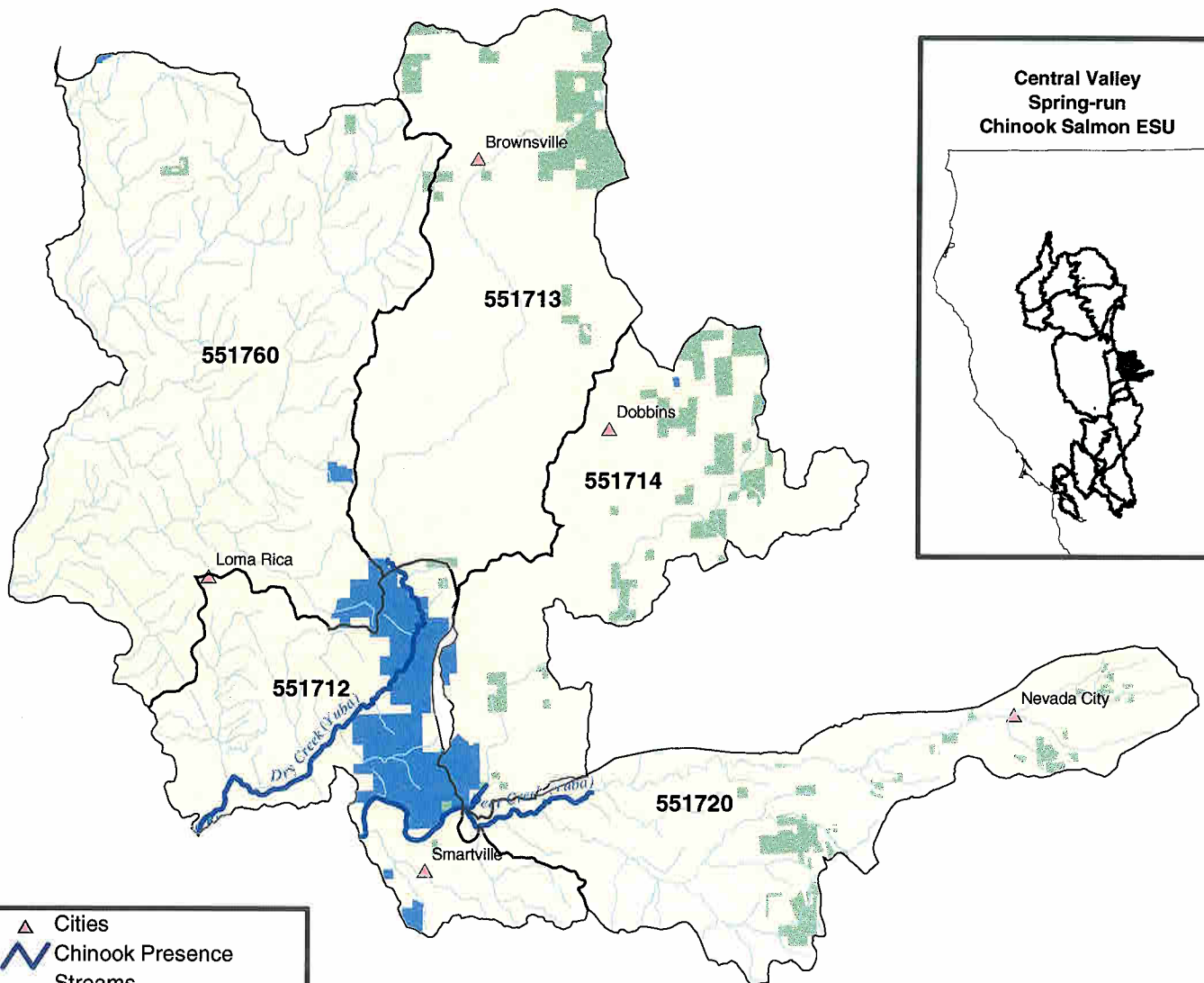
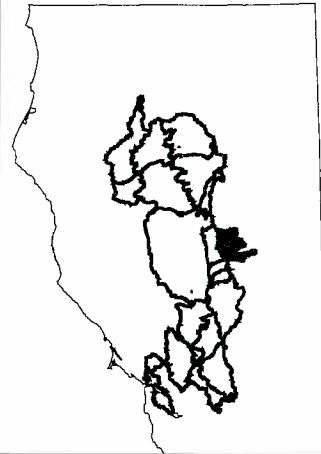


Note: This map is a DRAFT product for general reference only



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Land Ownership
Central Valley Spring-run
Chinook Salmon
Yuba River HU (5517)

Central Valley
Spring-run
Chinook Salmon ESU



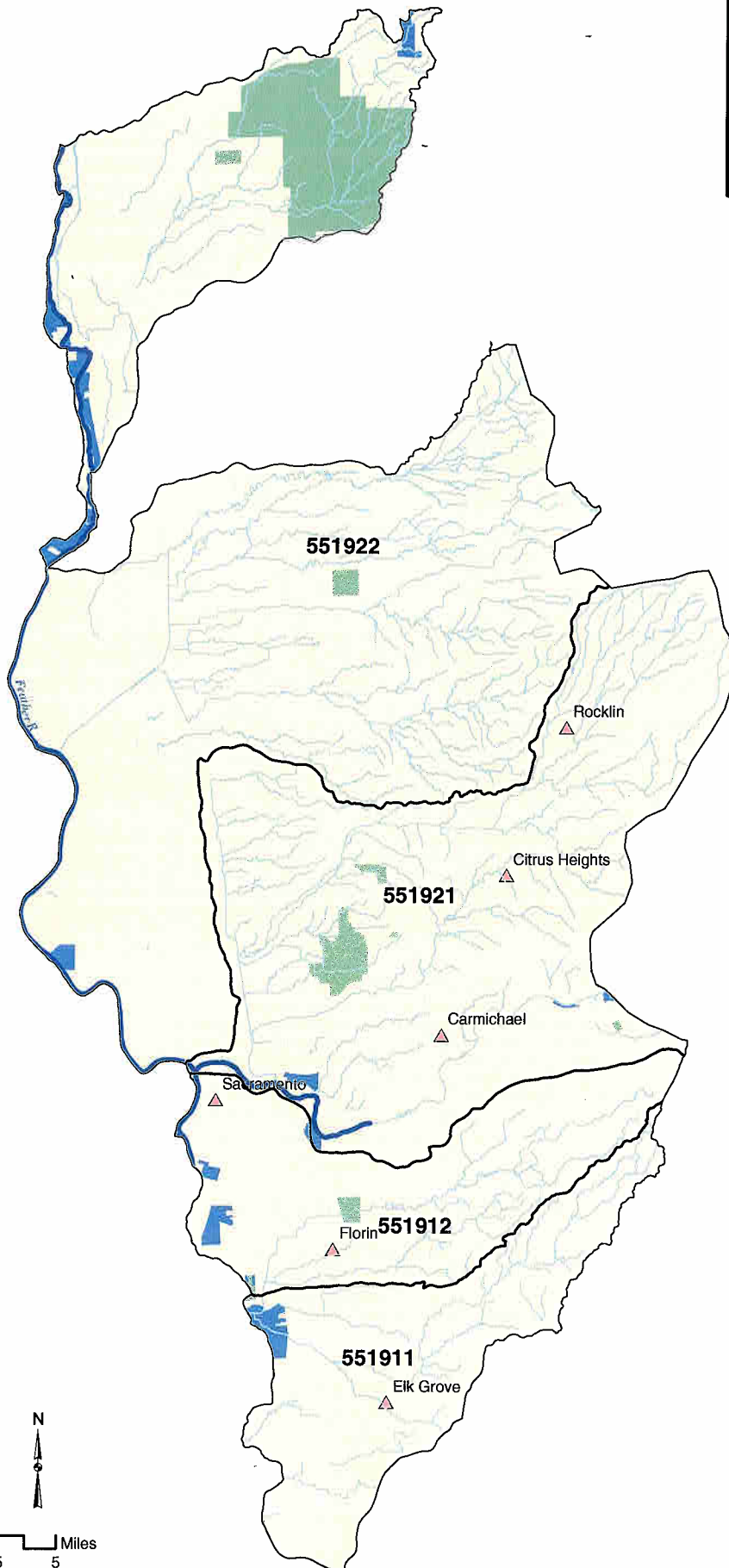
- △ Cities
 - ▬ Chinook Presence Streams
 - ▭ Hydrologic Unit Boundary
 - Land Ownership***
 - ▭ Tribal
 - ▭ Federal
 - ▭ State/Local
 - ▭ Private/Other
 - ▭ Water
- *Source: California Environmental Resources Evaluation System (CERES), 1999



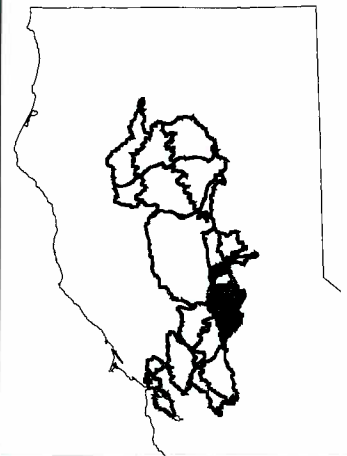
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Note: This map is a DRAFT product for general reference only

DRAFT
Land Ownership
Central Valley Spring-run
Chinook Salmon
Valley-American HU (5519)



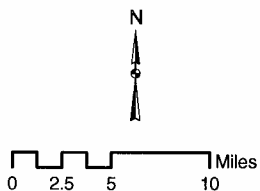
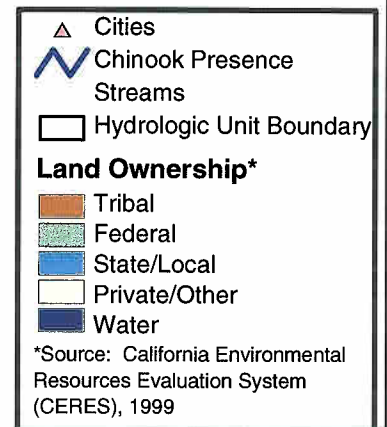
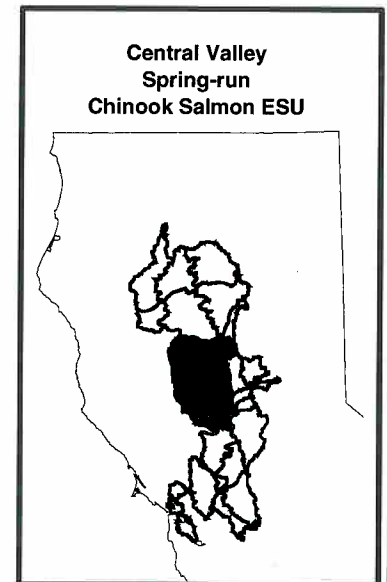
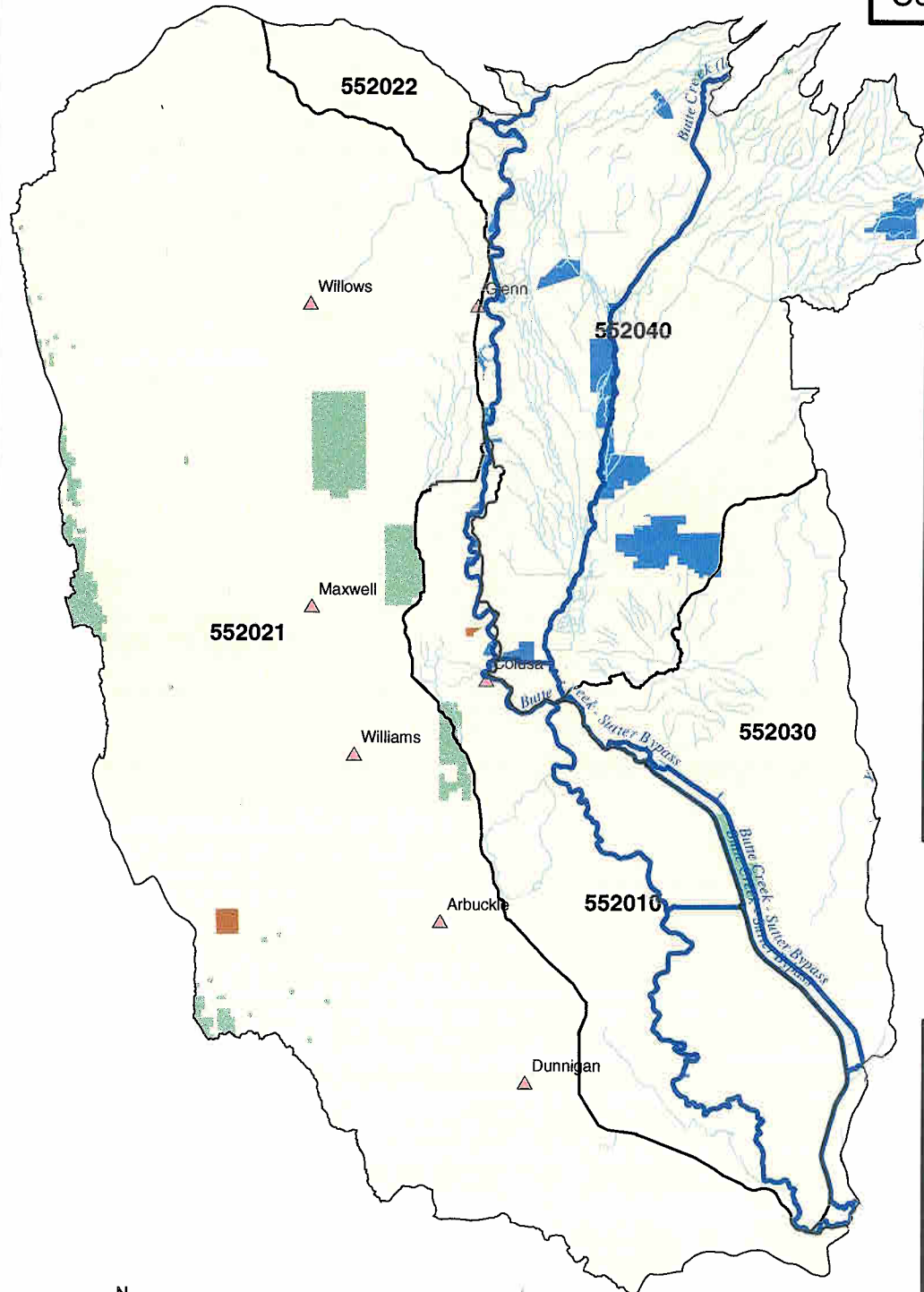
Central Valley
Spring-run
Chinook Salmon ESU



- △ Cities
 - ▬ Chinook Presence Streams
 - ▭ Hydrologic Unit Boundary
 - Land Ownership***
 - ▭ Tribal
 - ▭ Federal
 - ▭ State/Local
 - ▭ Private/Other
 - ▭ Water
- *Source: California Environmental Resources Evaluation System (CERES), 1999

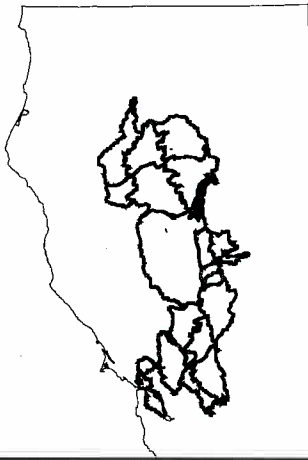
Note: This map is a DRAFT product for general reference only

DRAFT
Land Ownership
Central Valley Spring-run
Chinook Salmon
Colusa Basin HU (5520)

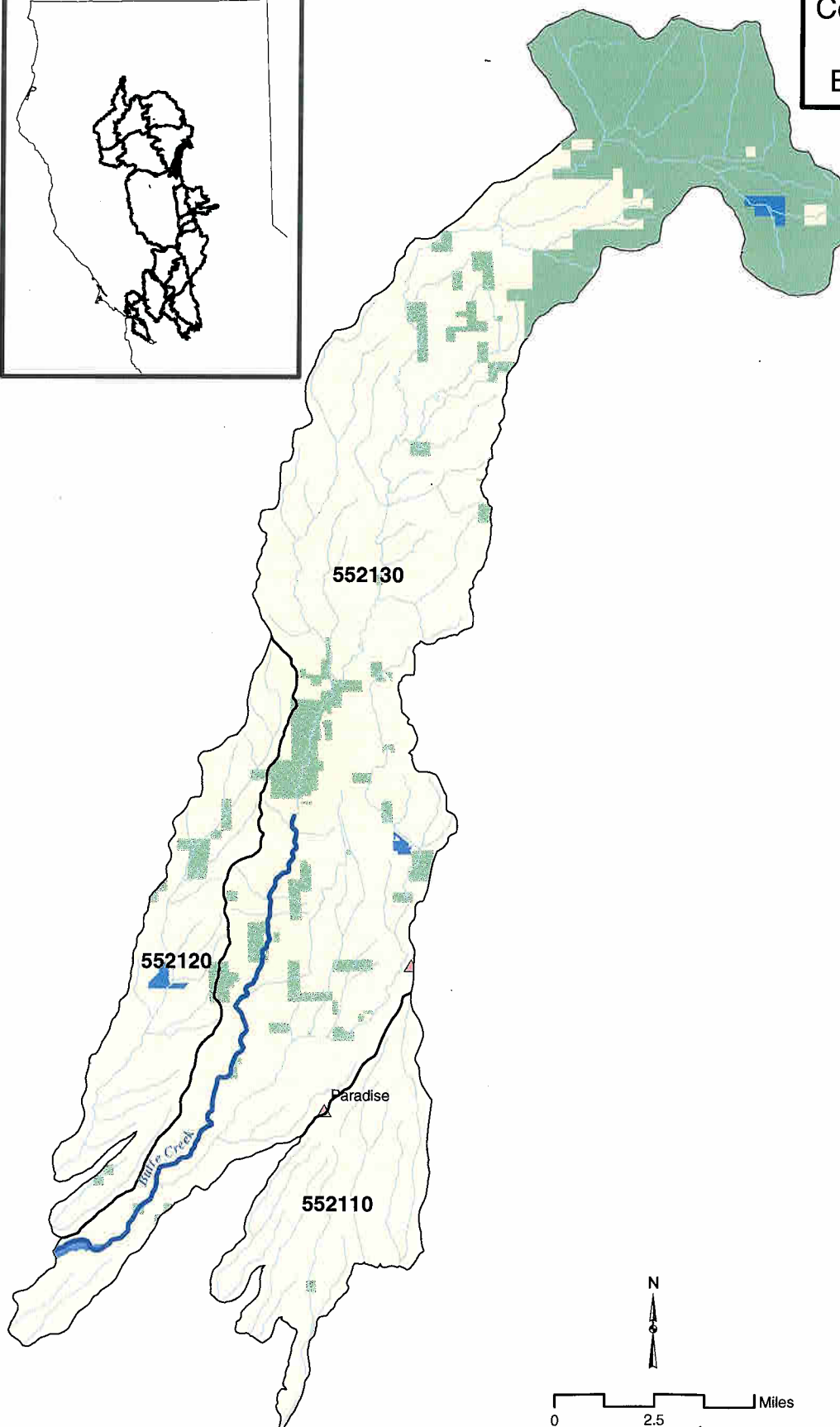


Note: This map is a DRAFT product for general reference only.

Central Valley
Spring-run
Chinook Salmon ESU



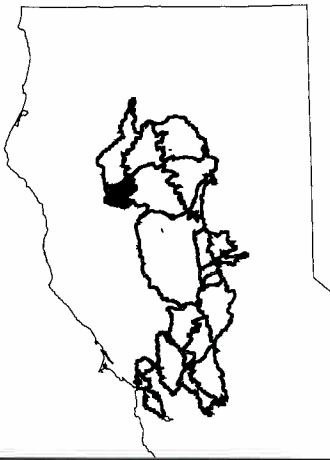
DRAFT
Land Ownership
Central Valley Spring-run
Chinook Salmon
Butte Creek HU (5521)



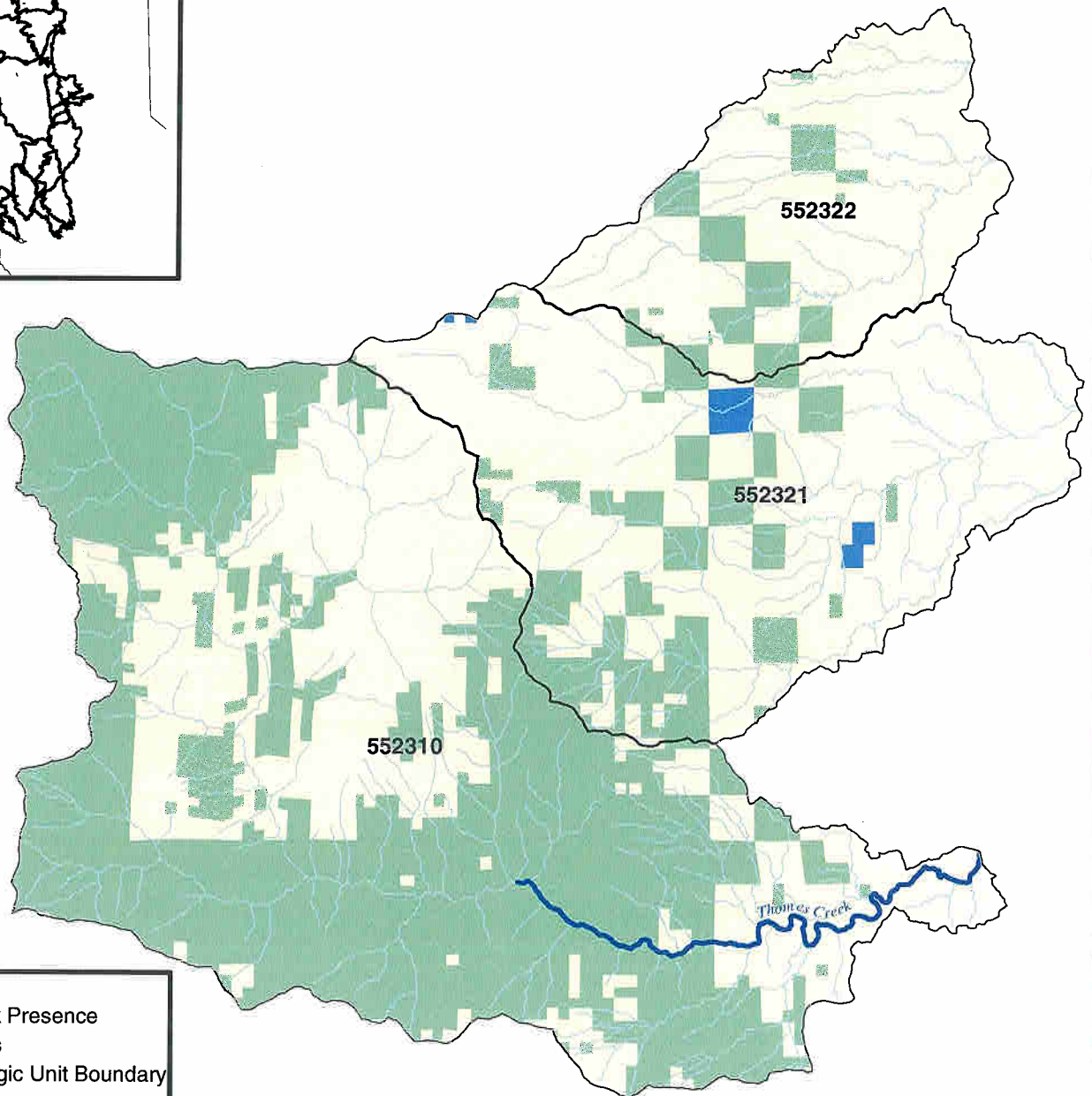
- △ Cities
 - ~ Chinook Presence Streams
 - Hydrologic Unit Boundary
 - Land Ownership***
 - ▬ Tribal
 - ▬ Federal
 - ▬ State/Local
 - ▬ Private/Other
 - ▬ Water
- *Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is a DRAFT product for general reference only.

Central Valley
Spring-run
Chinook Salmon ESU



DRAFT
Land Ownership
Central Valley Spring-run
Chinook Salmon
Ball Mountain HU (5523)



- △ Cities
- ▬ Chinook Presence Streams
- ▭ Hydrologic Unit Boundary

Land Ownership*

- ▭ Tribal
- ▭ Federal
- ▭ State/Local
- ▭ Private/Other
- ▭ Water

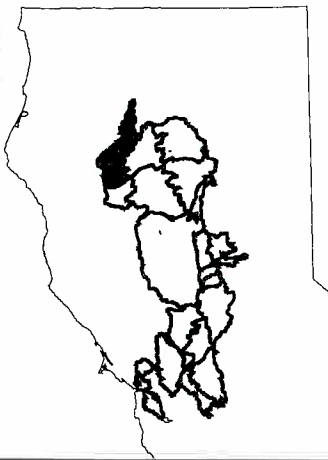
*Source: California Environmental Resources Evaluation System (CERES), 1999



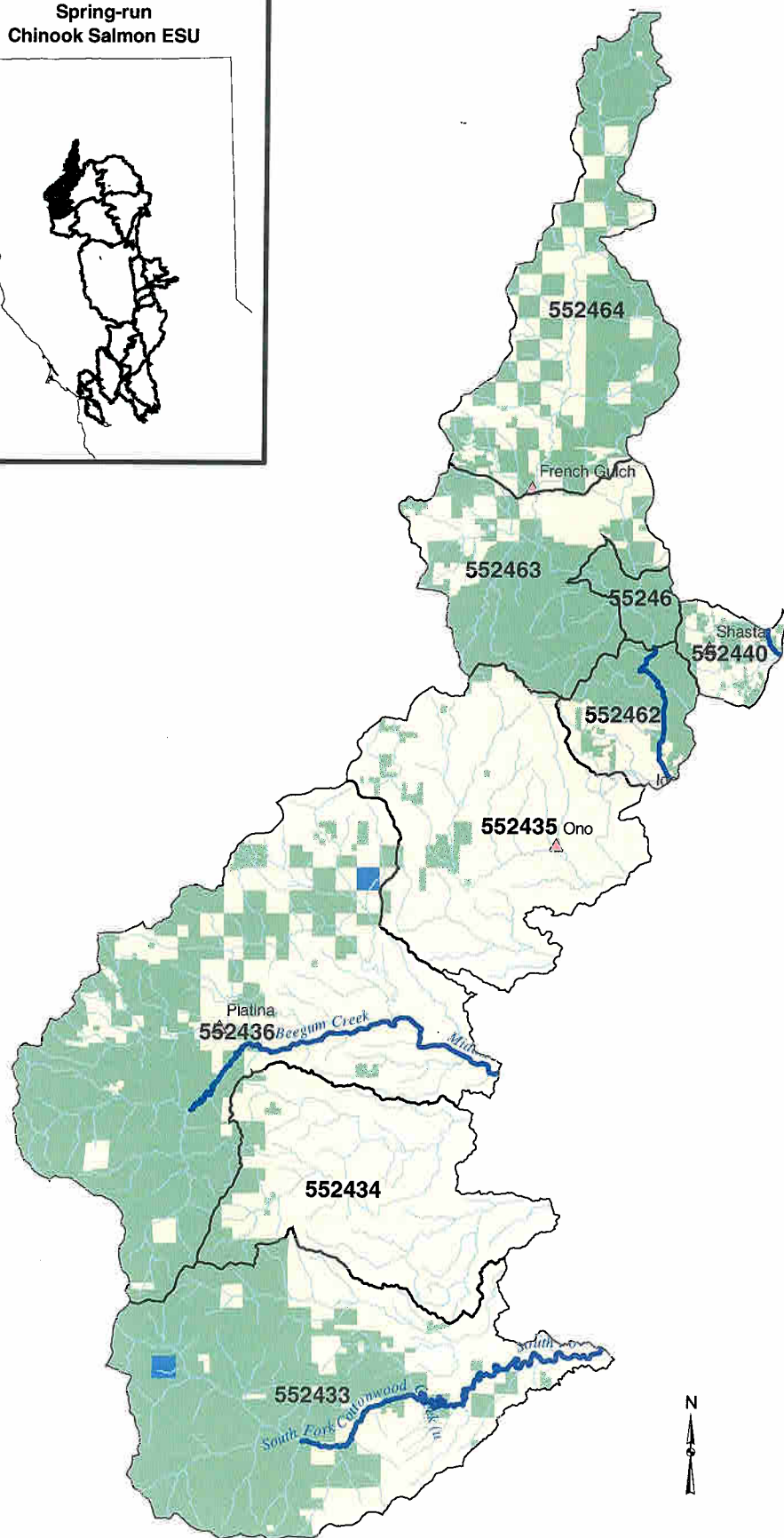
0 2.5 Miles

Note: This map is a DRAFT product for general reference only

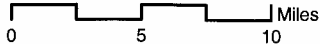
Central Valley
Spring-run
Chinook Salmon ESU



DRAFT
Land Ownership
Central Valley Spring-run
Chinook Salmon
Shasta Bally HU (5524)

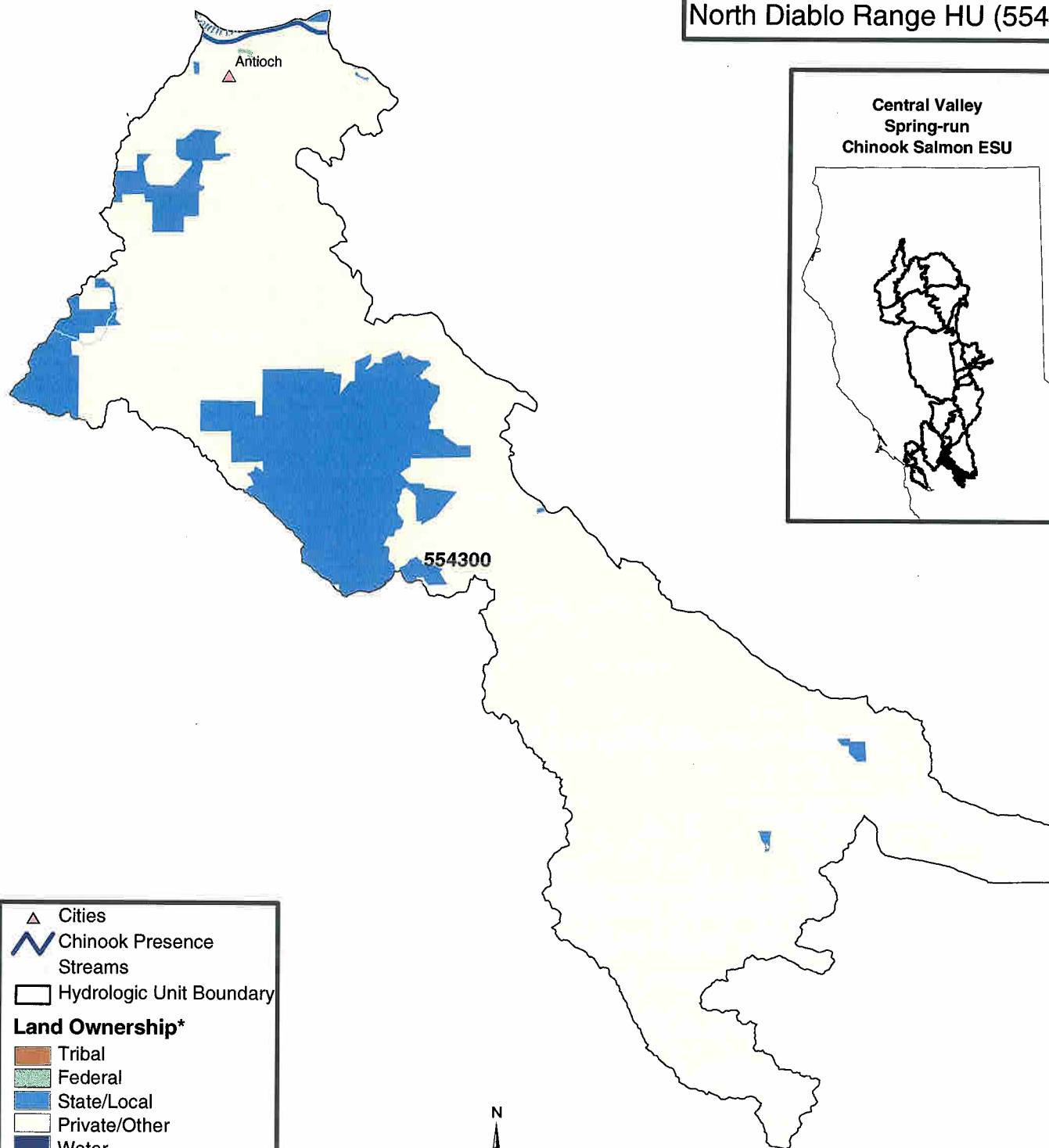
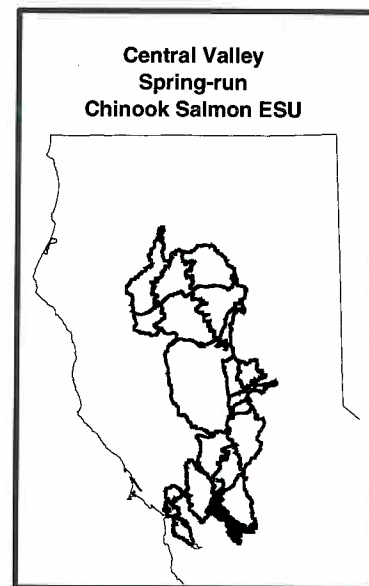


▲ Cities
 Chinook Presence
 Streams
 Hydrologic Unit Boundary
Land Ownership*
 Tribal
 Federal
 State/Local
 Private/Other
 Water
*Source: California Environmental Resources Evaluation System (CERES), 1999



Note: This map is a DRAFT product for general reference only

DRAFT
Land Ownership
Central Valley Spring-run
Chinook Salmon
North Diablo Range HU (5543)



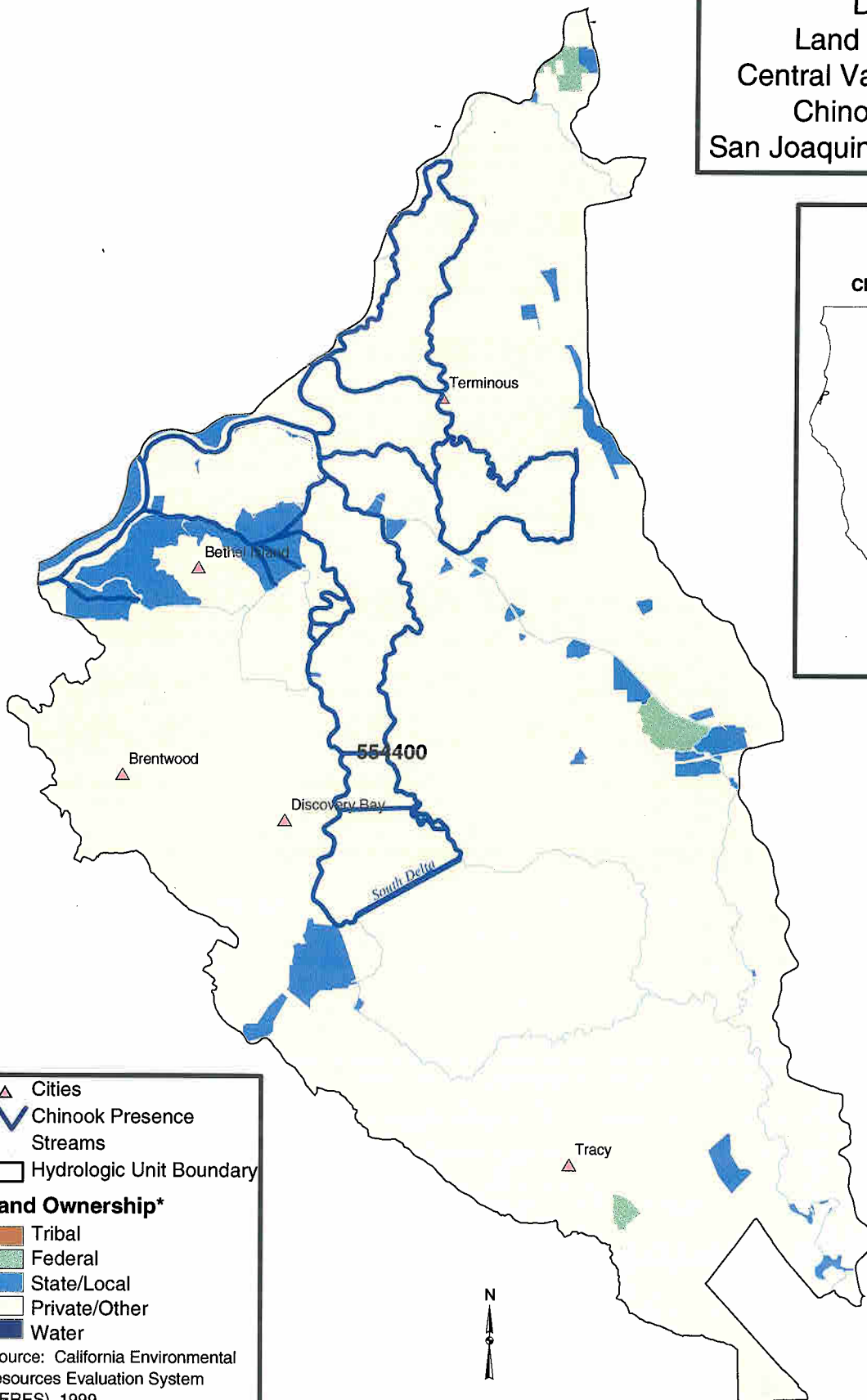
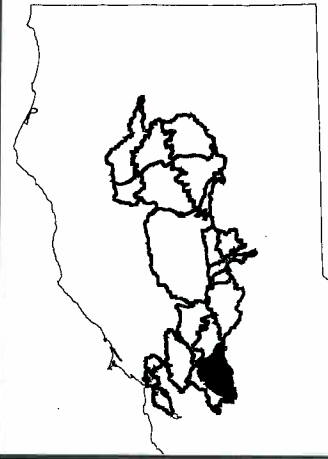
- △ Cities
 - ~ Chinook Presence Streams
 - Hydrologic Unit Boundary
 - Land Ownership***
 - Tribal
 - Federal
 - State/Local
 - Private/Other
 - Water
- *Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is a DRAFT product for general reference only

0 5 Miles

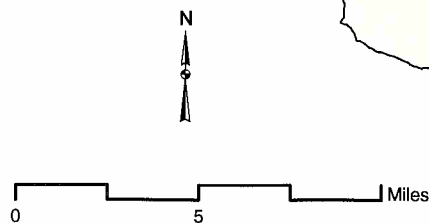
DRAFT
Land Ownership
Central Valley Spring-run
Chinook Salmon
San Joaquin Delta HU (5544)

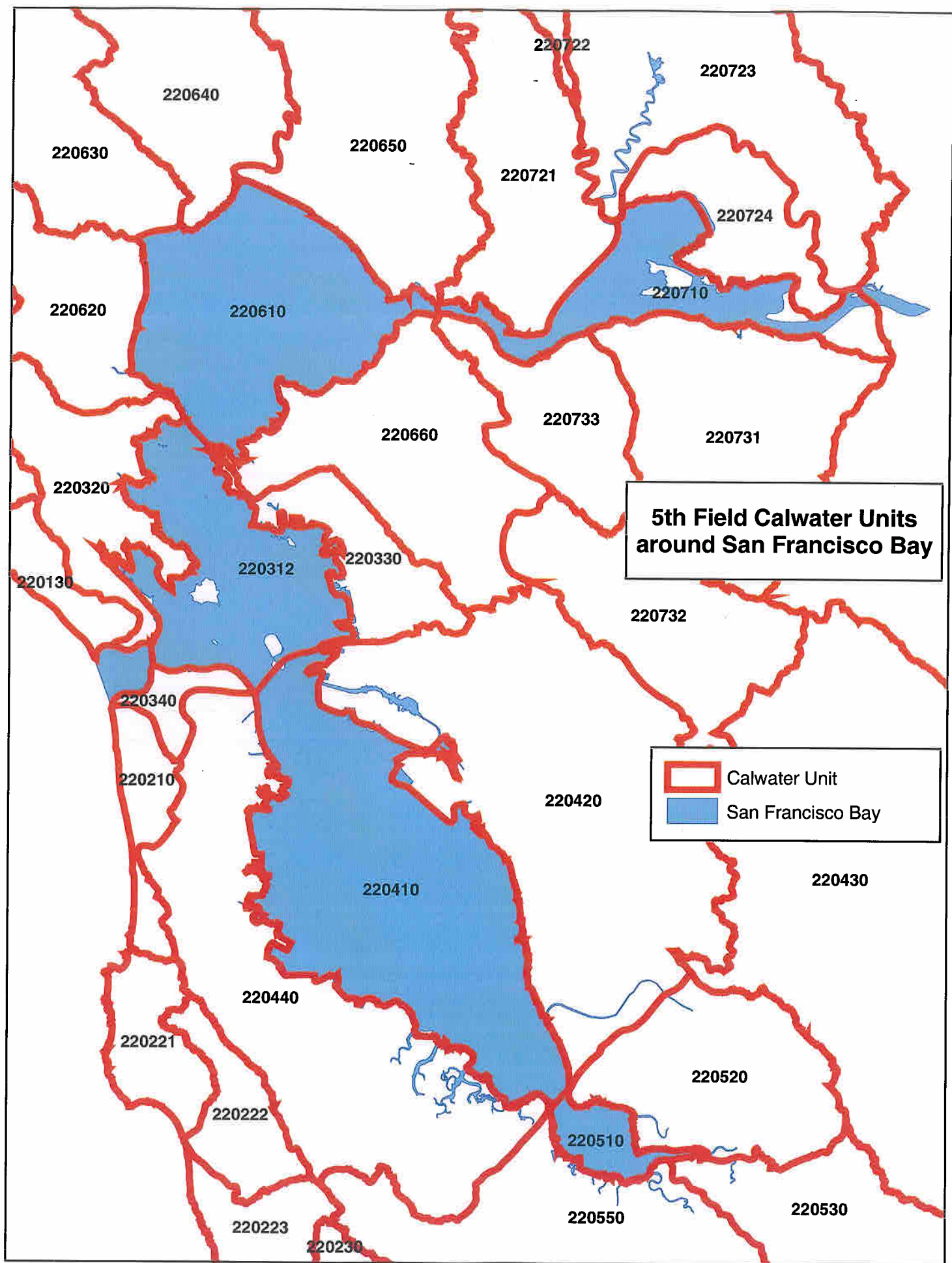
Central Valley
Spring-run
Chinook Salmon ESU



- △ Cities
 - ~ Chinook Presence Streams
 - Hydrologic Unit Boundary
 - Land Ownership***
 - Tribal
 - Federal
 - State/Local
 - Private/Other
 - Water
- *Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is a DRAFT product for general reference only

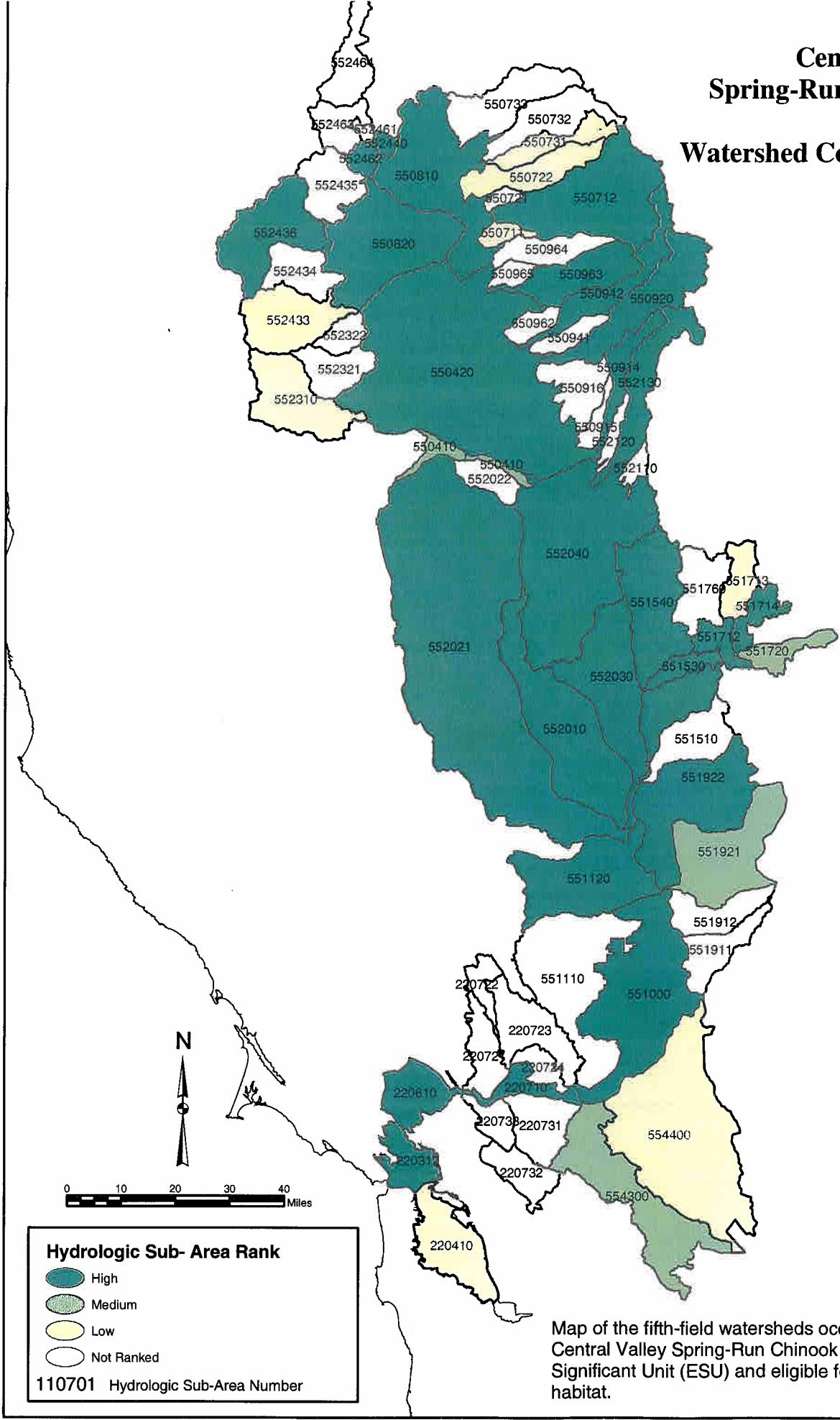




Map F17. Preliminary CHART Ratings of Conservation Value for Calwater HSA
Watersheds occupied by the Central Valley spring run chinook ESU

Draft Central Valley Spring-Run Chinook Salmon

Watershed Conservation Ranking



Map of the fifth-field watersheds occupied by the Central Valley Spring-Run Chinook Salmon Evolutionarily Significant Unit (ESU) and eligible for designation as critical habitat.